AILWAY

TRACK and STRUCTURES

February 1956

One of Five Specialized Railway Age Publications

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FORMERLY
Engineering and Maintenance

IMPROVED HIPOWERS
IMPROVE TRACK

Wherever track goes, at river level or over mountains, the maintenance man responsible for its upkeep can be more assured of reducing costs by using our tremendously strong spring washers. They absorb shocks; they protect railends and maintain constant bolt tension.

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

JACK-ALL

BALLAST REGULATOR

TRACK BROOM

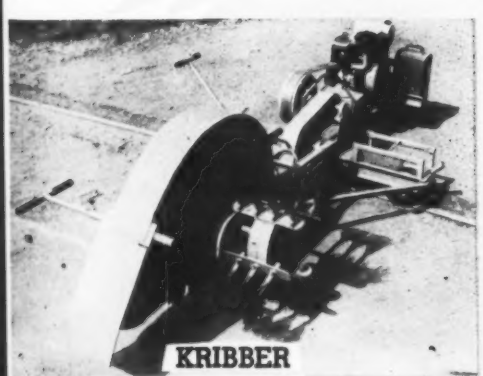
Kershaw

KERSHAW MANUFACTURING COMPANY, INC.
SERVICE POLICY

1. All machines purchased from Kershaw Manufacturing Company, Inc., are placed in service on the purchaser's railroad by a factory trained representative who personally supervises its installation and instructs the purchaser's service personnel in the proper use of the machine. In addition, a factory representative makes an additional call and inspection at an appropriate time after the machine has been in use.

2. Each Kershaw machine and each part sold by it is warranted to the purchaser for a period of ninety days after date of delivery to be free from any defect in material or workmanship except as to damage resulting from accident, alteration, misuse or abuse.

KERSHAW MANUFACTURING CO.
MONTGOMERY, ALABAMA


KRIBBER

ANOTHER PROGRESSIVE STEP BY KERSHAW!

KERSHAW MANUFACTURING CO. INC
MONTGOMERY K ALABAMA

TRACK CRANE

Stands Firm Without Track Bolts, Blocks or Clamps

A close look at Bethlehem's Hook Flange Guard Rail can be just as revealing for what you don't see as for what you do see.

For example, spacer blocks and bolts through guard rail web? Absent. Likewise bolts through the running rail. Same goes for heavy, bulky clamps imbedded in the ballast. These things would only be superfluous and money-wasting in the Hook-Flange Guard Rail.

Why? Well, first there is the hook flange itself. The "hook" is rolled into the inner flange of the guard rail so that it fits under a portion of the running rail, resting snugly in a recess in the special tie-plate. Hence the weight of the passing train keeps the guard from overturning, no matter how severe the side thrust.

Next the double-shoulder construction of the tie-plates in the straight guarding area. These shoulders engage the bases of both rails, to prevent spreading. Tie plates are integral members of the assembly.

We believe this to be the safest device of its kind ever made, and to the best of our knowledge no Bethlehem Hook Flange Guard Rail has ever broken under traffic. It's very easy to install, and even easier to maintain. A nearby Bethlehem representative will be glad to cover any further points with you at your convenience. Just phone or drop a line to our nearest sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM HOOK FLANGE GUARD RAIL

BETHLEHEM STEEL

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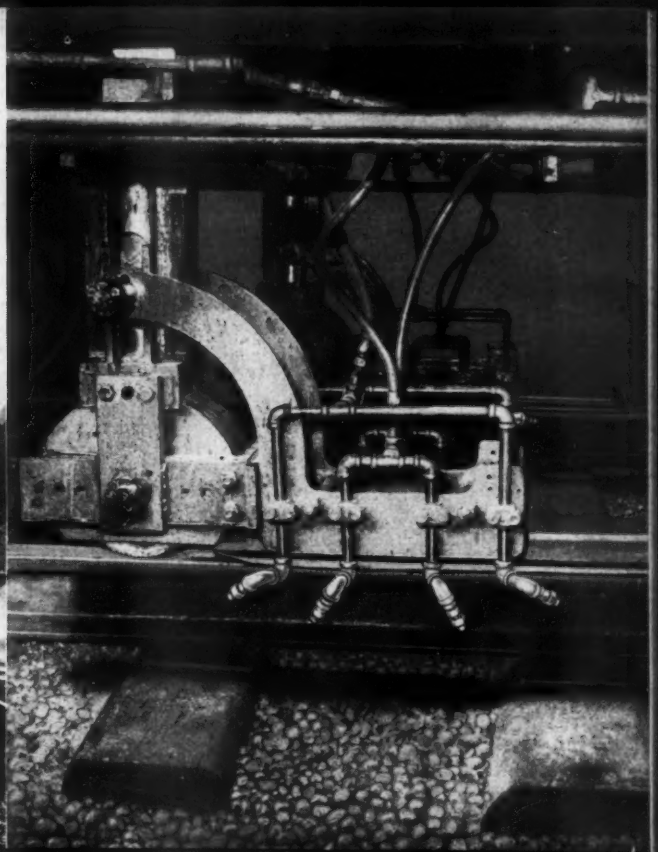
One of the 160 Uses of CONCRETE on Railroads

NO. 29 OF A SERIES

The triple concrete box culvert illustrated below features sections 10-ft. square. It is over Pogue's Run in Indianapolis, Ind. and is owned jointly by the city and the Indianapolis Union Railway.

Concrete box culverts are just one of more than 160 uses for portland cement and concrete which enable American railroads to improve service and save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in ***low-annual-cost*** service. This saves money for other budget items.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



2 sure *Nalco* ways

TO REDUCE TRACK MAINTENANCE COSTS

Nalco WEED and BRUSH CONTROL

Nothing beats Nalco Chemicals for controlling weeds, brush and grass all season long.

There's an added advantage, too — Nalco assures the most economical application. With tank car lots of chemical you get free use of a modern Nalco spray car that gives precise dosage exactly where you want it on the right-of-way. And in yards, or other congested areas, Nalco's on-track or off-track mechanical spreaders give excellent distribution of granular H-174. Packaging in 100 pound fibre drums assures convenient handling of this effective herbicide.

Nalcote RAIL and RAIL FASTENING ANTI-CORROSION CONTROL

You furnish only the work train and crew — Nalco provides the superior asphalt-base *Nalcote* coating, the special *Nalcote* Spray Cars *and* the experienced operators.

The results? Up to 140 miles of track per day protected against corrosion from mid-point of rail head to outer edges of tie plates. All vulnerable metal is covered with a uniform coating — even spikes, bolt heads, angle bars and anchors.

The cost? Usually no more than the cost of manually painting angle bars alone.

Your Nalco Representative has full details . . . or write direct.

NATIONAL ALUMINATE CORPORATION
SPRAY SERVICES DEPARTMENT
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Nalco®

PRODUCTS . . . Serving the Railroads through Practical Applied Science

More and more "RIBBONRAIL" SERVICE

year after year BECAUSE...

1 *Faster, higher quality production is continuing to reduce weld costs in spite of rising labor and material costs.*

2 *From weld making to rail laying, modern engineers have developed continuous rail laying into a swift, efficient operation.*

During the 18 year history of continuous rail, installation time and welding costs have constantly decreased . . . Hundreds of miles of this safe, trouble-free rail are already in service in all sections of the country, and major railroads are installing more all the time.

Reduce your track, roadway, and rolling stock maintenance, and improve riding qualities. Look to LINDE, the leader in continuous rail welding, and plan for RIBBONRAIL Service now. Call or write the Railroad Department of Linde Air Products Company.

look to **LINDE** *for* **RIBBONRAIL** *service*
Service Mark

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

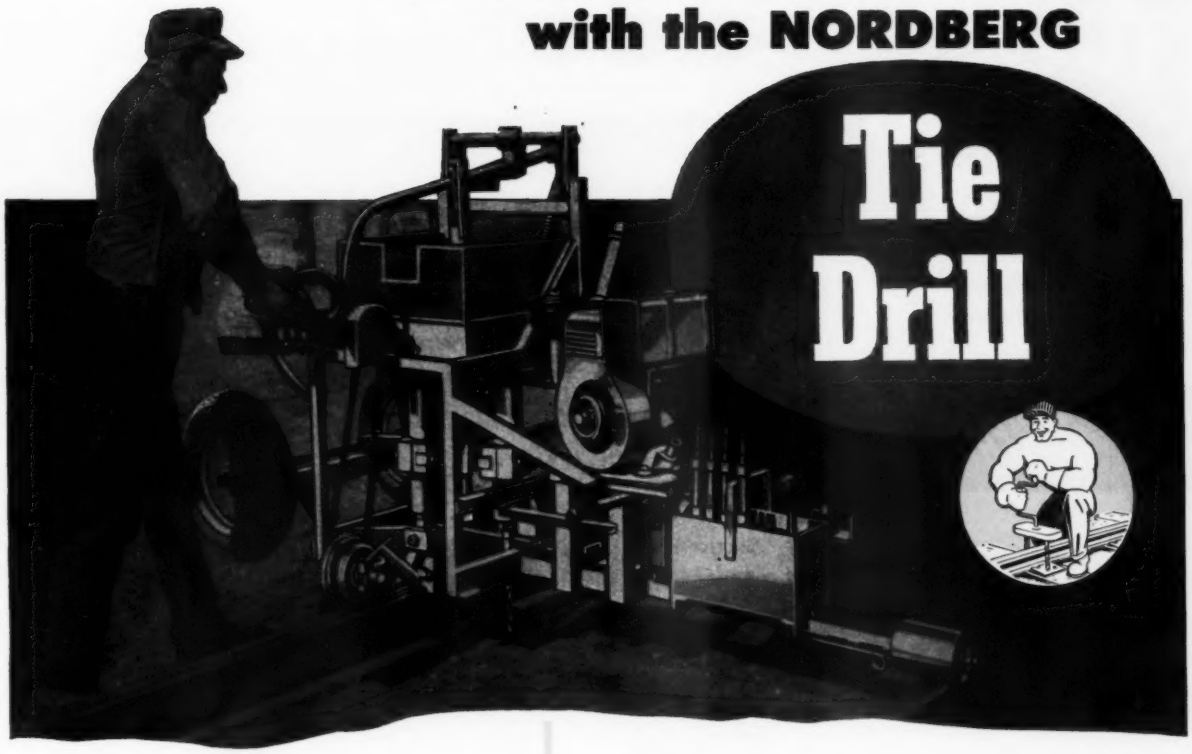
Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol . . .

"Linde" and "Oxweld" are trade-marks, and "Ribbonrail" is a service mark of Union Carbide and Carbon Corporation.

save time and money
DRILL TIES BEFORE SPIKING
with the NORDBERG



Advantages:

- *Field drilling costs can be cut about 75%*
- *Speeds rail laying . . . drills two holes at once, in less than 3 seconds per hole*
- *Easily operated by one man*
- *Drills holes for rail holding or plate fastening spikes*
- *Always drills holes at right angles to tie*
- *Spikes have greater holding power . . . tie life is considerably extended*

THE fully proved Nordberg Tie Drill is the maintenance machine you need for cutting tie drilling costs . . . and for increasing the life of your ties.

This accurate machine is the fastest tie drill on the market. It is operated by one man, who can spot and drill 48 holes in 24 ties of one rail length in just 2½ minutes . . . which is less than 3 seconds per drilled hole.

You can't afford to overlook savings like this! For further details about the Nordberg Tie Drill, write for Bulletin 199.

© 1955, Nordberg Mfg. Co.

R755

NORDBERG
"Mechanical Muscles"®

ADZING MACHINE • BALLAST ROUTER • CRIBEX® • BALLASTEX® • SCREENEX® • HYDRAULIC and MECHANICAL SPIKE PULLERS • SPIKE HAMMER • TIE DRILL • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS • TRACK SHIFTER • DSL® YARD CLEANER • TRAKLINER • GANG TAMPER • DUN-RITE® GAGING MACHINE • GANDY—TIE PULLER and INSERTER

NORDBERG MFG. CO., *Milwaukee, Wis.*

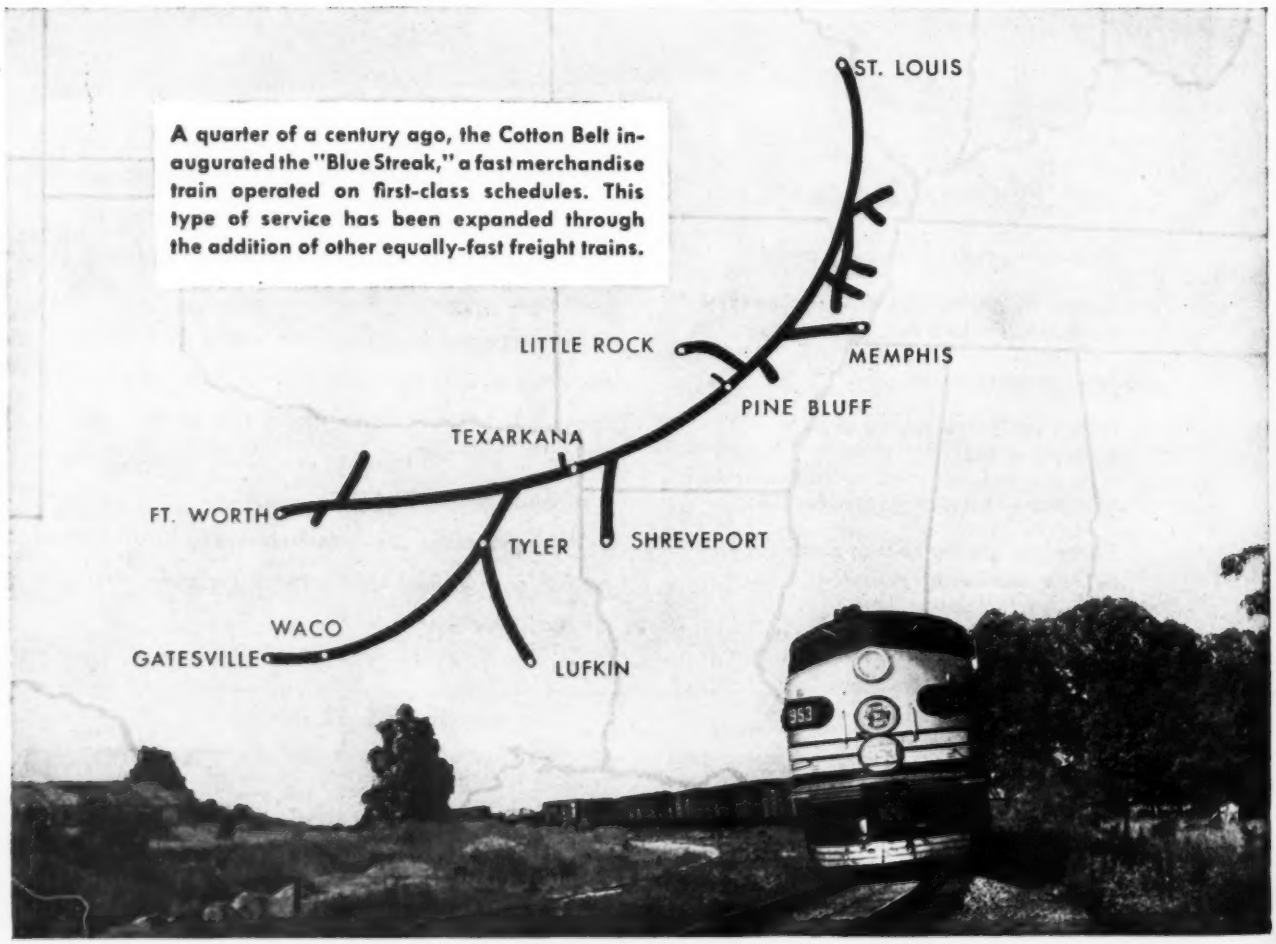
NORDBERG MACHINERY

COTTON BELT ROUTE adopts new

BLUE STREAK

The Cotton Belt has long been recognized for its fast freight service. In 1931 a fast merchandise train known as the "Blue Streak" was inaugurated, operating from St. Louis to Pine Bluff, Arkansas, with connections for Louisiana and Texas points. Simultaneously with the inauguration of the "Blue Streak," the Cotton Belt was one of the first railroads in the country to establish coordinated rail-highway service.

In keeping with the Cotton Belt's permanent progressive policy over the years to provide faster, efficient transportation service to and from the great Southwest, is its early recognition of CF&I's improved rail sections. The adoption of the heavier sections as standard is an expedient to meet the ever-increasing traffic demands.



A quarter of a century ago, the Cotton Belt inaugurated the "Blue Streak," a fast merchandise train operated on first-class schedules. This type of service has been expanded through the addition of other equally-fast freight trains.

rail sections

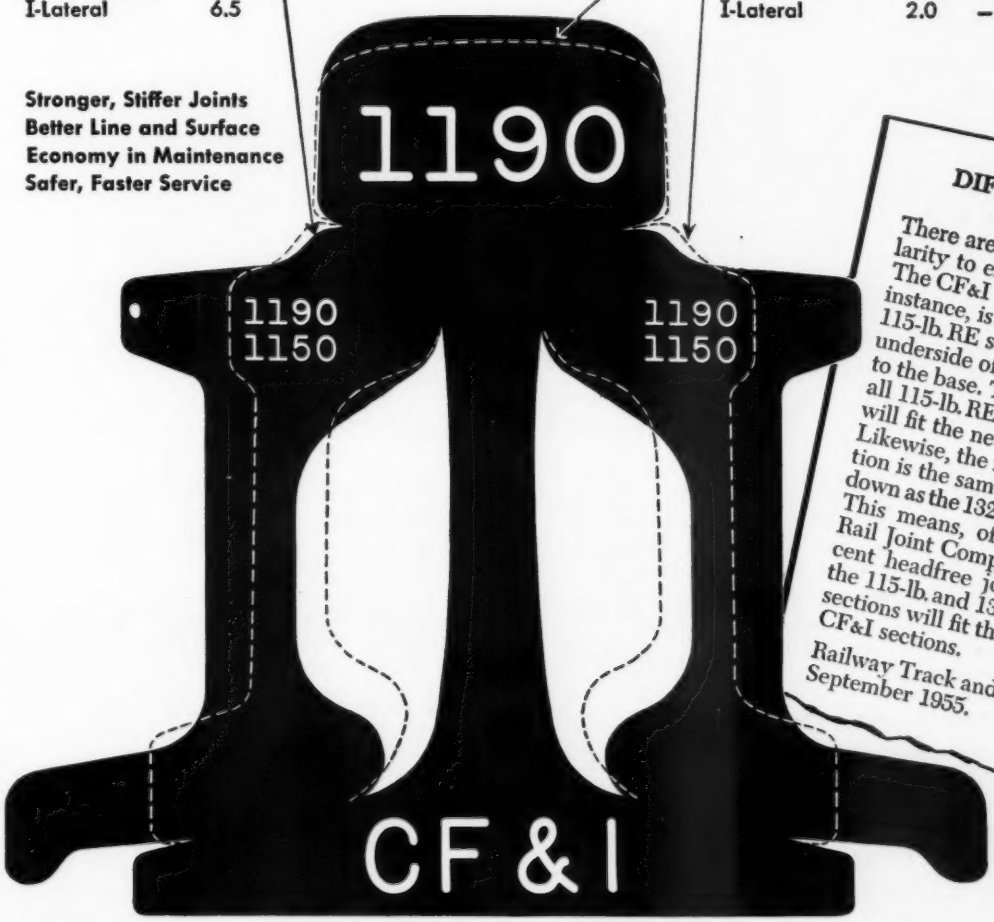
Rail Joint Company

Toe Joint	115-119F
I-Vertical	30.2
Head Modulus	12.6
I-Lateral	6.5

Stronger, Stiffer Joints
Better Line and Surface
Economy in Maintenance
Safer, Faster Service

A.R.E.A. Standard 115# Rail and Joint

I-Vertical	20.6	−47%
Head Modulus	8.5	−48%
I-Lateral	2.0	−225%



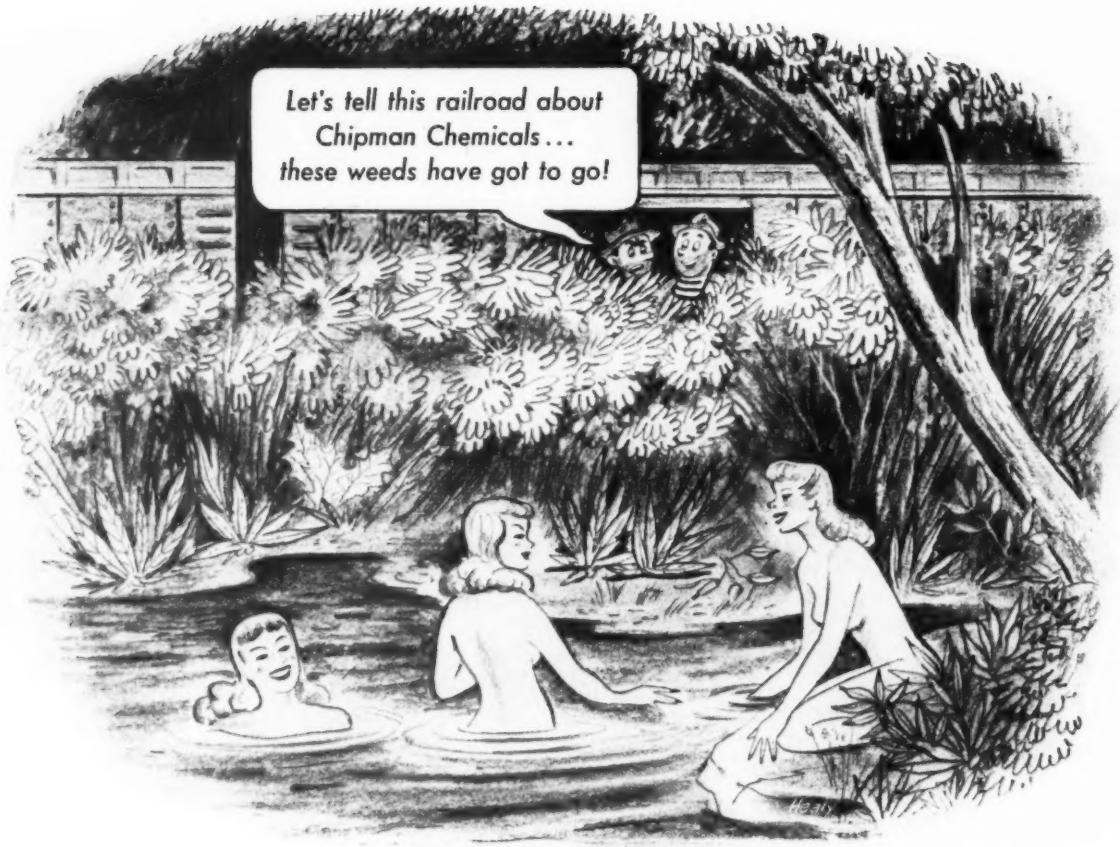
New 119# Rail and Joint Standard, 1956
Assembly shown above approximately 80% of actual size.

DIFFER FROM RE SECTIONS

There are also points of similarity to existing RE sections. The CF&I 119-lb. section, for instance, is identical with the 115-lb. RE section from the underside of the head down to the base. The result is that all 115-lb. RE track fittings will fit the new 119-lb. section. Likewise, the new 136-lb. section is the same from the head down as the 132-lb. RE sections. This means, of course, that Rail Joint Company 100 per cent headfree joint bars for the 115-lb. and 132-lb. RE sections will fit the new CF&I sections.

Railway Track and Structures, September 1955.

CF&I
THE COLORADO FUEL AND IRON CORPORATION



Chipman Chemical Company weed killers, brush killers and application service are backed by over 40 years of experience in serving railroads. An extensive line of weed, grass and brush killing chemicals is available to meet varying conditions. Included are the following:

Atlacide	Atlas "A" Arsenical
Chlorax	Atlas "D"
Chlorax "40" • Chlorea	Brush Killer
TCA-Chlorax	Telvar W
Methoxone-Chlorax	Borax • Dalapon

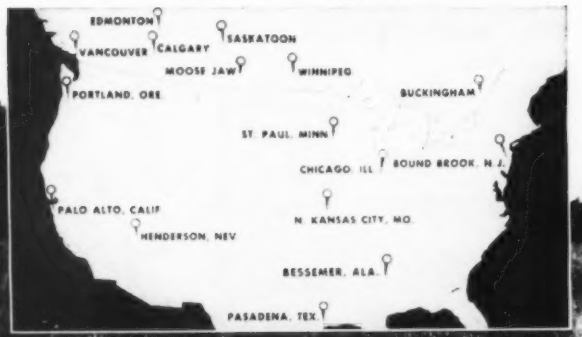
Let us solve *your* weed problems with the *right* chemicals and application service.

CHIPMAN

Chemical Company, Inc.

Bound Brook, New Jersey

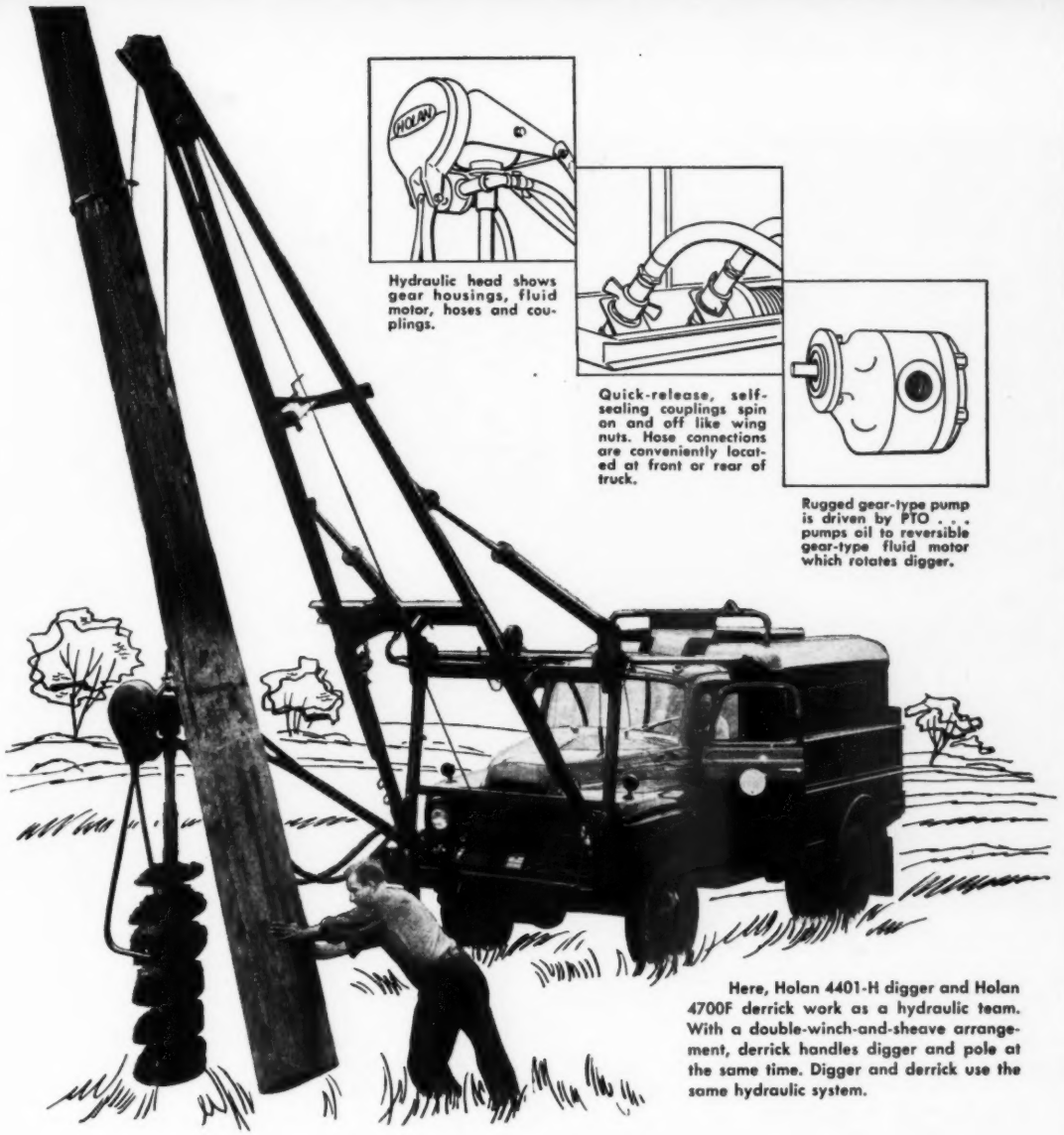
16 Strategically Located Chipman Plants



Hydraulic head shows gear housings, fluid motor, hoses and couplings.

Quick-release, self-sealing couplings spin on and off like wing nuts. Hose connections are conveniently located at front or rear of truck.

Rugged gear-type pump is driven by PTO . . . pumps oil to reversible gear-type fluid motor which rotates digger.



Here, Holan 4401-H digger and Holan 4700F derrick work as a hydraulic team. With a double-winch-and-sheave arrangement, derrick handles digger and pole at the same time. Digger and derrick use the same hydraulic system.

HYDRAULIC POWER MAKES BORING JOBS PLEASANT

Holan's new hydraulic digger is smooth going down. In fact, the 4401-H digs holes so easily that you appreciate most what it doesn't do. It doesn't vibrate and tire the workmen. It doesn't create mechanical stresses when stalled. And it doesn't require a lot of maintenance — there are no bearings, no universal joint, no shear pin, no complicated mechanical linkages. Putting it positively, the 4401-H makes hole-digging anywhere easier than ever before.

The Holan 4401-H Hydraulic Earth Borer digs holes from 8 to 20 inches in diameter and up to eight feet deep. Write for the new catalog.

J.H. HOLAN® CORPORATION

4100 WEST 150TH STREET
CLEVELAND 11, OHIO

OTHER PLANTS:
HOLAN Thrift Line CORP., Griffin, Georgia • J. H. HOLAN CORP., Phoenix Div., Arizona
BRANTFORD-HOLAN LIMITED, Brantford, Ontario

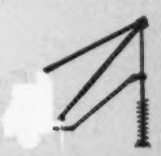
THE NAME THAT MEANS WORK SIMPLIFICATION

Line construction bodies for light to heavy-duty. Crew compartments optional. Efficient tool compartments and drawers.

Service bodies for chassis up to 1½ ton. Lengths, 72", 75", 84", 90", and 102".

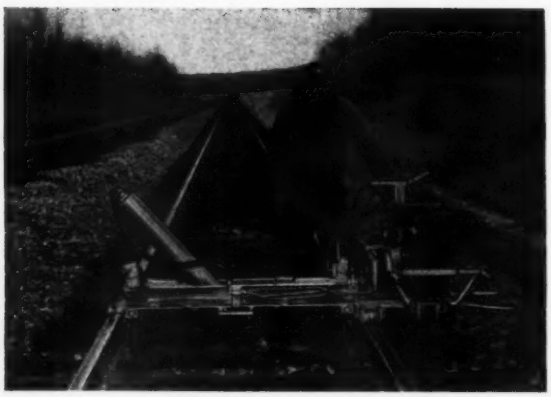
Hydraulic derricks designed for rear mounting. Capacities to 12,000 lbs. Also, light-duty, power-operated derricks.

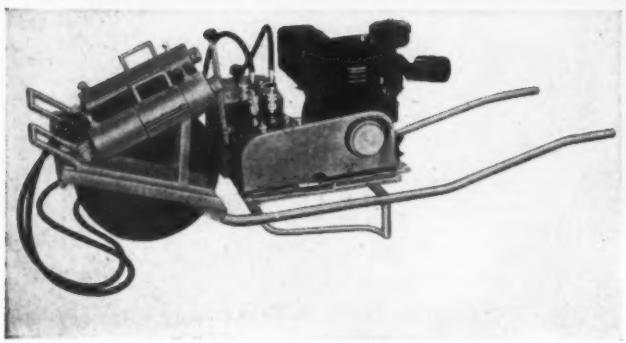
Ladders to 40' with all phases completely hydraulic. Pump actuated by P.T.O. or separate engine drive with electric starter. Also, expertly-engineered mechanical ladders to 32'.

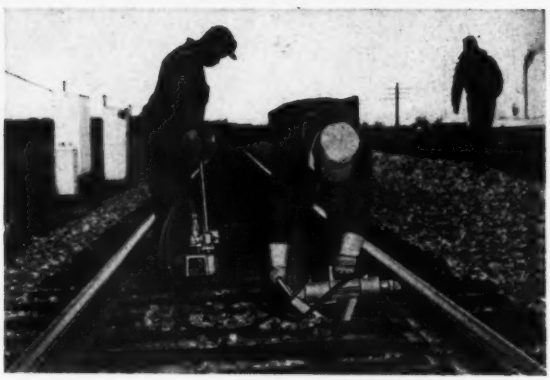


Portable mechanical and hydraulic earth borers with optional rotation.

Hydraulic towers from 17' to 30' with rotary, stationary, or transverse platforms. Exclusive box-girder telescoping mast.







Upper left—Model P-O gasoline engine powered Hydraulic Track Liner operating two hydraulic rams.

Upper right—Model P-O gasoline engine powered Hydraulic Track Liner operating attachment with double flanged track rollers, adjustable for any height and weight of rail.

Lower left—Model P-O gasoline engine powered Hydraulic Track Liner and two hydraulic rams mounted on wheelbarrow type frame that can easily be operated or transported by one man.

Lower right—Model H-O Hydraulic pump, light weight, hand operated, that will supply power for one (as shown) or two rams. Ideal for small gangs.

RTW HYDRAULIC TRACK LINER

More track lined per hour with Minimum effort and expense

The RTW Hydraulic Track Liner—Model P-O—was devised and designed by railroad engineers thoroughly familiar with maintenance of way problems.

A light rigid self contained attachment with double flanged rollers used with the P-O Track Liner adjusts to any height or weight of rail. It supports a portable air-cooled 8 horsepower gasoline driven engine. This power plant can be used with two hydraulic rams for lining thru switches, road crossings, etc., as well as supplying power for the attachment for out-of-face lining. Its light weight and portability reduces operator fatigue.

This equipment is also available mounted on a wheelbarrow type frame that can be transported by one man for use in heavy traffic areas.

The hand operated hydraulic pump, available with either one or two hydraulic rams, is ideal for spot lining with small gangs.

The interchangeable units of these highly portable power operated Hydraulic Track Liner combinations afford a smaller force, the equipment necessary to do the work that normally would require heavier oversized machines and a large crew.

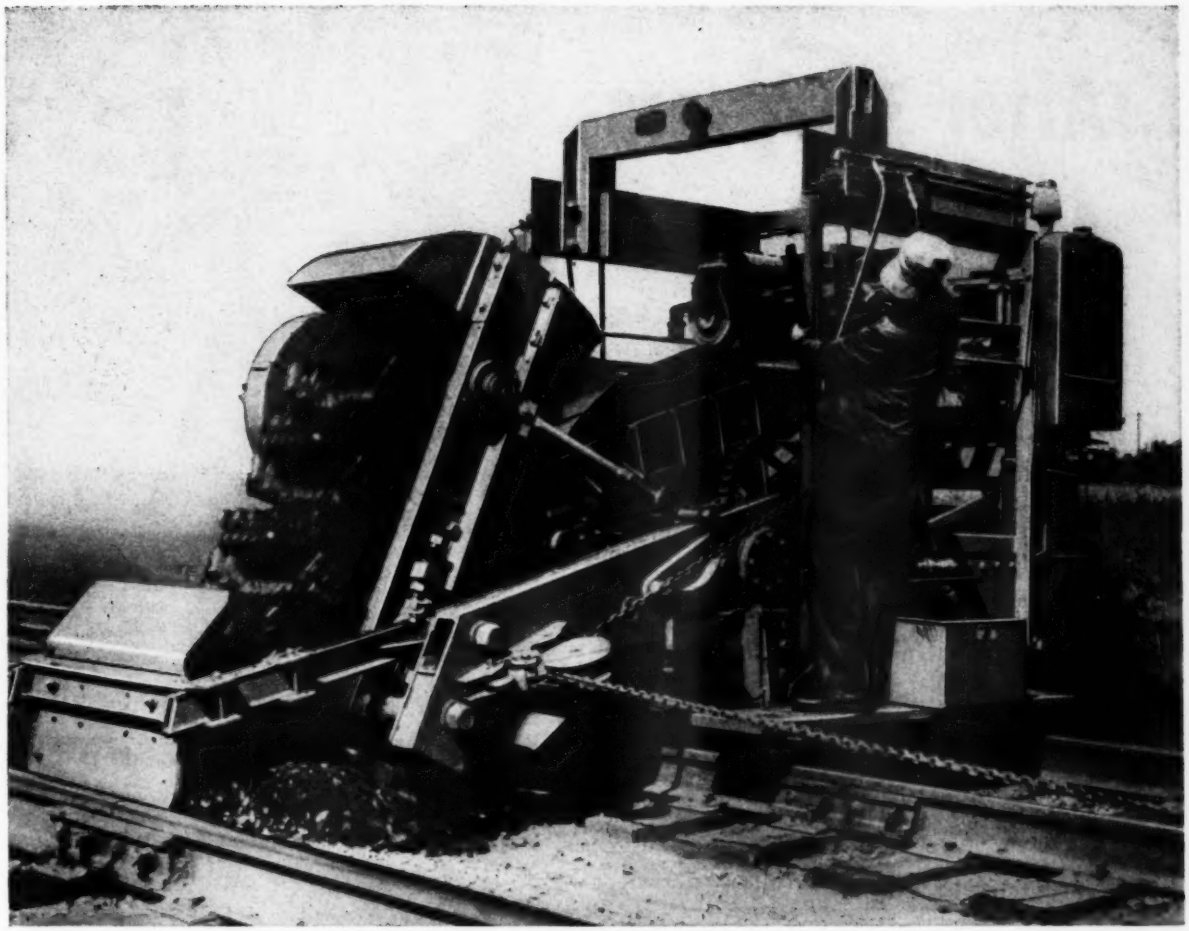
Write for complete details today

Railway Track-work Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

TRACK MAINTENANCE MACHINERY

Rail Grinders • Switch Grinders • Cross Grinders • Surface Grinders • Rail Drills • Ballast Extruders • Bit Sharpeners • Tie Nippers • Grinding Wheels • Cut-off Wheels • Track Liners



All types of maintenance equipment, such as this ballast machine excavating intertrack ballast, can now be serviced with ONE grease...Esso Multi-Purpose Grease.

SIMPLIFY TRACK AND MACHINERY MAINTENANCE... USE ESSO MULTI-PURPOSE GREASE

Now ONE grease serves many purposes in railroad track and right-of-way maintenance work. Esso Multi-Purpose Grease is gaining wide acceptance with more and more railroads, because it is ideally suited for maintenance-of-way equipment such as ballast cleaners, tampers, cribbers, screeners, and many others including automotive and construction equipment.

ESSO MULTI-PURPOSE GREASE offers three important advantages:—

1. Its unexcelled quality has been proved by performance on the road and in the lab in a multitude of applications. For example, it has outstanding bearing sealing properties and ability to meet the extreme requirements of automotive wheel bearings, yet performs equally well in applications requiring a general purpose grease.
2. It eliminates the need for a variety of greases. ONE grease serves many purposes, preventing the application of the wrong grease and possible damage to machines.
3. Storage and handling problems are reduced to a minimum, resulting in additional economy. It is easier to protect a single container of Esso Multi-Purpose Grease against contamination than several partially empty special-purpose drums.

Valuable years of experience in research and development, along with continual testing on the road and in the lab, stand back of the outstanding performance of famous Esso Railroad Products.

Esso

RAILROAD PRODUCTS

After 46 years ARMCO pipe still serves efficiently

In 1910, a 48-inch-diameter plain galvanized Armco Corrugated Metal Pipe was installed as a culvert under the main line of the Chicago Great Western Railroad. It is at Mile Post 265.04, between Readlyn and Waverly, Iowa.

The culvert is still giving good service today!

Armco Corrugated Metal Drainage Structures have material durability and structural strength to meet railroad service conditions. Installation is easy and economical and there is practically no maintenance.

Armco Pipe diameters range from 8 inches to 15 feet. And pipe-arch structures are supplied in comparative sizes. Choice of gages to meet any strength requirement. For severe erosive or corrosive conditions there is Armco PAVED-INVERT or ASBESTOS-BONDED Pipe and Pipe-Arch. Armco Drainage & Metal Products, Inc., 3656 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

This photo, taken in 1922, shows 48-inch-diameter Armco Corrugated Metal Pipe installed in 1910.

Recent photo of this 46-year-old Armco Corrugated Metal Pipe shows practically no change.

ARMCO®

ARMCO DRAINAGE STRUCTURES

ARMCO PRODUCTS FOR RAILROAD APPLICATIONS: Corrugated Metal Pipe • Pipe-Arch • MULTI-PLATE Pipe and Pipe-Arch • Bin-Type Retaining Walls • Perforated Subdrainage Pipe • Steel Buildings • FLEX-BEAM Guardrail • Tunnel Liner Plates • Foundation Pile Shells

Frank Aikman, Jr., Chief Engineer, The Long Island Railroad describes his road's operation as, "a total of only 356 miles of track carrying in excess of 78 million passengers per year; more than any other railroad in the United States. In addition, it hauls nearly 5 million tons of freight a year. Such density of traffic places an exceptional responsibility upon the maintenance-of-way function. To assure the safety of passengers and freight we have entrusted the inspection of our track to Sperry Rail Service since 1934."

L.I Guards Nation's Most Traveled Tracks with SPERRY RAIL SERVICE

"More than 1200 movements per day pass through Jay Interlocking, just west of Jamaica Station. Even at off-peak hours," Mr. Aikman reports, "track gangs must be able to replace frogs, switch plates or rails within one-half hour maximum headway time. The skill and teamwork of our maintenance crews play a large part in achieving the Long Island's record for safe, efficient operation."

"An observer can get a good idea of the Long Island's traffic density and complex trackage at the Van Wyck Express Way where trains operate on three different levels." Mr. Aikman continues, "Each day 824 passenger trains and 30 freight trains complete scheduled runs over the Long Island System. Track maintenance must be accomplished without interruption of these schedules."

"Our unique traffic pattern requires that much of our rail inspection be done at night during off-peak hours," states Mr. Aikman. "Each year the close cooperation and efficiency of Sperry personnel and equipment make such unusual inspection possible and provide us with vital information concerning the condition of our rail."

Rail-testing requirements of modern railroads are individual and specific. However, the paramount importance of effective inspection of rail in track is recognized by all. To provide the equipment, personnel and experience that can meet this responsibility has always been the primary function of Sperry Rail Service. Write or phone for latest procedures on the testing of rail in track, diesel axles, wheels and similar vital components.

Sperry

FIRST IN RAIL TESTING

SPERRY RAIL SERVICE

Division of Sperry Products, Inc.

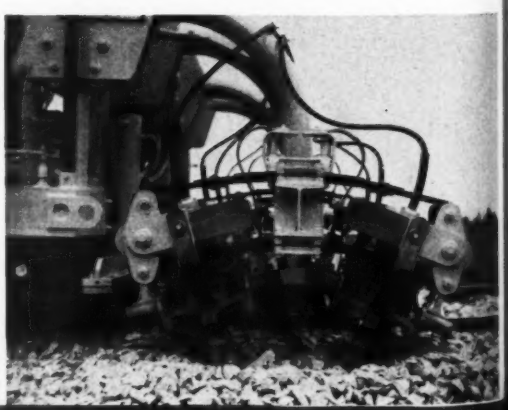
Danbury, Conn.

New York Chicago St. Louis

Now Better than ever!

JACKSON TRACK MAINTAINER

Note in the close-up views how the tamping bars penetrate way under the tie and directly beneath the rail.



Two important improvements made in the Jackson Track Maintainer for '56, make it more than ever the greatest piece of equipment ever devised for both putting up and maintaining finest quality track under ALL CONDITIONS.

1. Perfect directional control of the tamping bars assures even greater efficiency in the tamping operation. Uniform, close consolidation of the greatest amount of ballast in the normal tamping area is the result, with maximum compaction secured right under the rail.

2. A material increase in vibratory energy — the heart of the Jackson tamping method — provides super-abundant, correctly applied power to the tamping bars so that no job is too tough — regardless of lift of track and ballast size or condition.

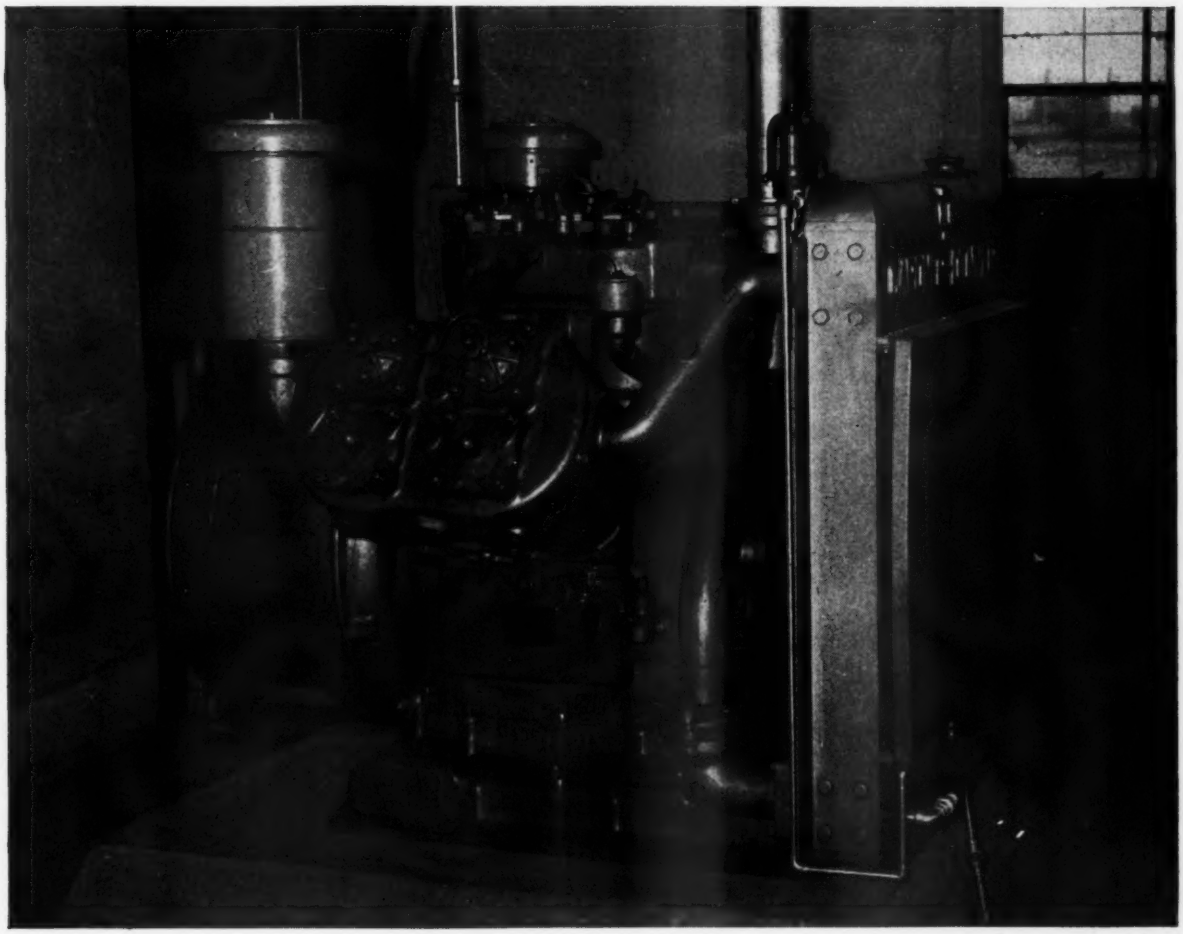
Thorough investigation is bound to convince you that purchase of this machine constitutes the best possible investment in an all-purpose, on-track tamper.

ACQUIREMENT PLANS TO SUIT YOUR NEEDS

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

Gardner Denver . . . Serving the World's Basic Industries



Moves in fast . . . starts right away . . .
Gardner-Denver WB Compressor

It's as easy as it looks in this picture to install a Gardner-Denver WB Compressor. Hook up the wiring . . . air line . . . controls—that's about all there is to it. Not much of a foundation is needed—because vibration has been designed out of the machine. The packaged unit has a built-in motor, and a self-contained radiator-intercooler that solves cooling-water problems.

Available in seven sizes from 142 to 686 cfm. Write for Bulletin WB-10, with full specifications.

Another popular Gardner-Denver compressor—noted for long, steady runs—the model AA. Bulletin AA6.

GARDNER - DENVER

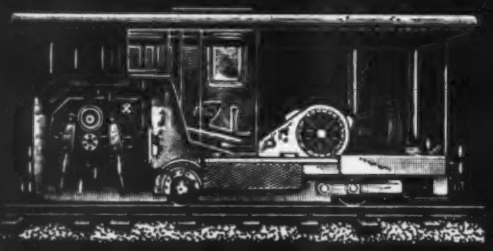
THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

FOR RAISING

Matisa

SELECTIVE DEPTH TAMPING



With vibratory compaction—Now at your budget level! The True tamping principle for surfacing or making high or low lifts.

OR

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UNDER-THE-TIE BALLAST CLEANING

The only ballast cleaner that does a complete job. Cleans (or excavates) ballast in cribs, under ties, on shoulders, between tracks. Improves clearance in tunnels and at O.H. bridges, lengthens cleaning cycle.

LOWERING TRACKS

Matisa

EQUIPMENT CORPORATION

1020 WASHINGTON AVE. · CHICAGO HEIGHTS, ILLINOIS

ALL OVER THE WORLD

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY

TRACK and STRUCTURES

FEBRUARY, 1956

The American Institute of Management has cited eight U. S. railroads as "excellently managed." The eight are the Santa Fe, Atlantic Coast Line, Burlington, Illinois Central, Louisville & Nashville, Seaboard, Southern Pacific and Union Pacific.

•

Gross capital expenditures in 1955 by Class I line-haul railroads are expected to total over $890 million, as reported by the Bureau of Transport Economics and Statistics of the ICC. The report also indicated that 1956 first-quarter expenditures will be up 87 per cent from the first quarter last year.

•

The Louisville & Nashville plans to order some 50 diesel locomotives early this year. When they are delivered, the road will be completely dieselized.

•

A wage increase notice of $3 per day, along with demands for a company-financed health and welfare plan, for the Brotherhood of Locomotive Fireman and Engineman is expected to be filed with individual roads soon.

•

A wage boost of 10½ cents an hour, retroactive to October 1, 1955, has settled the wage dispute between the Order of Railway Conductors and Brakemen and the railroads. The settlement provides that four cents of the 10½ cents is in lieu of a railroad-financed health and welfare plan.

•

Settlement of a wage dispute between the railroads and 11 non-operating unions has been reached, providing for a 14½-cent across-the-board wage boost retroactive to December 1, 1955. It also provides that, effective March 1, 1956, railroads will pay the entire cost of the hospital and medical benefit plan now in effect. The unions originally demanded a 25-cent an hour wage increase.

•

Travel on regularly scheduled domestic air lines in 1955 was 12 times as hazardous than travel by rail. The air lines' fatality rate, estimated by the Civil Aeronautics Authority, was 0.75 passengers killed per 100 million passenger-miles flown. The rate on the railroads for the first 10 months was 0.06 per 100 million passenger-miles.

•

The net income of railroads for 1955, after deductions for taxes, rentals, fixed and contingent charges and miscellaneous items, came to an estimated $915 million, an increase of 34 per cent over 1954, according to the Association of American Railroads. Earnings for the year will give carriers a 4.15 per cent rate of return on their investment, compared with 3.28 per cent in the previous year.

•

Over 95 per cent of the ties in tracks maintained by railroads at the end of 1954 were treated. The exact figure was 95.1 per cent leaving 4.9 per cent of the ties untreated. The progress made in 13 years is pointed up by comparable figures as of the end of 1941, which were 83.7 per cent and 16.3 per cent, respectively. The average cost per treated tie laid in replacement in 1954 was $3.37, while in 1941 it was $1.31.

•

The contribution of the railroads under the Railroad Unemployment Insurance Act has been boosted to 1½ per cent of the taxable payroll. This action means that the carriers may have to pay around $70 million in 1956 in payroll taxes, at the present level of employment.

How to

CUT CLEARING COSTS

To help you clear land faster and cheaper, here are NEW IDEAS developed by clearing specialist Wade Lahar Construction Co. These "tricks" will help Lahar and their 22 International tractors finish a 23,500-acre job at Buford Dam 7 months ahead of an 18-month schedule.

One pass levels 18-inch trees—Where clearing to ground level is your primary job, Contractor Lahar recommends a big International tractor and V-shaped cutter. The cutter shown was designed and built by Herman Hackler, project manager, at Lahar's home plant in Mountain Home, Arkansas. Four 200 hp International TD-24's, so equipped, are handling most of the Buford Dam reservoir clearing near Atlanta, Georgia. In typical operation, they cut over so much land that 18 other International tractors are

1-to-5 slopes, 1,300 acres per month—Your TD-24 will efficiently clear trees from steep grades as well as from level ground. Here's what Herman Hackler, project manager for Lahar on the $1,611,560 contract, says about this big 200 hp, 8 mph crawler: "TD-24's high-low steering range keeps cutter against the tree until it falls, even on steepest slopes. This factor, plus the "24's" great power, excellent traction, and over-all balance, is letting us crawler-cut 99% of our Buford Dam job, despite slopes averaging 1-to-5, and, in some places, 1-to-4. Our fleet of *22 International tractors*—11 TD-24's (four of them with cutters), six TD-18's, three TD-14's, and two TD-9's—clears and rakes 1,300 acres per month. This production, in our opinion, could not be exceeded by any other make of tractor!"

Burn, turn with one tractor—On big jobs, Mr. Lahar suggests use of one medium-sized tractor to handle burning of brush piles. This leaves bigger machines free for production work. Note how clear the raked ground is behind tractor. When Lahar's job is done, some 14,000 acres will be completely cleared; about 9,400 acres partly cleared, with some trees left standing in the water to benefit future water life.

Team decking boosts output—Where terrain permits, three to six of Lahar's 22 IH crawlers team to rake and pile the cut brush and trees. This gives two advantages . . . (1) rakes, by catching both ends of fallen trees and brush, pick up material lying between tractors which normally would require separate pass . . . (2) one pass per team is all that's needed to provide a clean swath.

kept busy decking and burning. One pass of their 13-ft long, 14-ft wide blade slices saw-like through brush, pine, and mixed hardwoods up to 18 inches in diameter. For scattered trees up to 12 inches in diameter, a similar though smaller cutter is used on a 66 dhp International TD-14A. Both TD-24 and TD-14 have a canopy of 2 and 2½-inch pipe. This protects operator and machine. Entire canopy and cutter assembly pins to regular A-frame . . . can be quickly detached and interchanged with standard or other special blades.

Blade "saws" larger trees—If your clearing work involves trees larger than 18 inches, here's another idea from Wade Lahar Construction Co. Using same mild-steel cutter blade as on smaller trees, have TD-24 operator "see-saw" back and forth a few times to cut the trunk. Just a few seconds' work with the 64,000-lb TD-24 will topple the tree.

Careful in-the-field maintenance boosts output, too. Left, mechanic uses compressed air to blow dirt and leaves from TD-24 radiator core. Right, special steel tooth, 2½ ft long with 18-inch overhang, is welded to TD-24 blade. Four teeth and top blade extension are used per raking tractor.

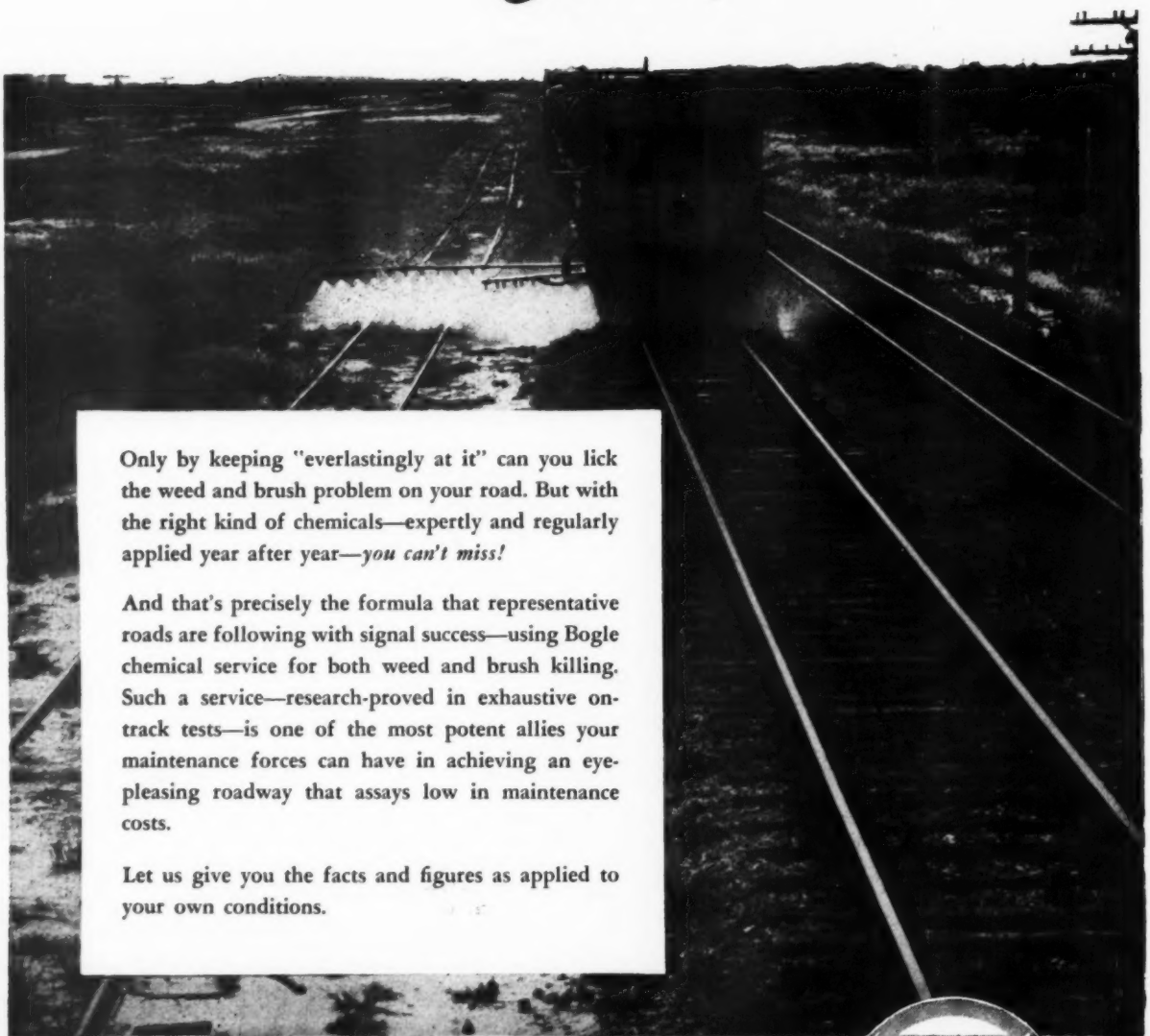
Winches logs from swamp—Clearing from marshy areas may present you with quite a problem too. Wade Lahar Construction Co does this work, 1% of their 23,500-acre Corps of Engineer job, with chain saw crews and winch-equipped TD-9 and TD-18 crawlers. After winching in, tractors skid timber to central area.

International makes every load a pay load

Industrial Power

A machine size for every job . . . see your nearest INTERNATIONAL INDUSTRIAL POWER DISTRIBUTOR for details.

IT PAYS OFF IN LOWERED MAINTENANCE COSTS *Every Time*



Only by keeping "everlastingly at it" can you lick the weed and brush problem on your road. But with the right kind of chemicals—expertly and regularly applied year after year—*you can't miss!*

And that's precisely the formula that representative roads are following with signal success—using Bogle chemical service for both weed and brush killing. Such a service—research-proved in exhaustive on-track tests—is one of the most potent allies your maintenance forces can have in achieving an eye-pleasing roadway that assays low in maintenance costs.

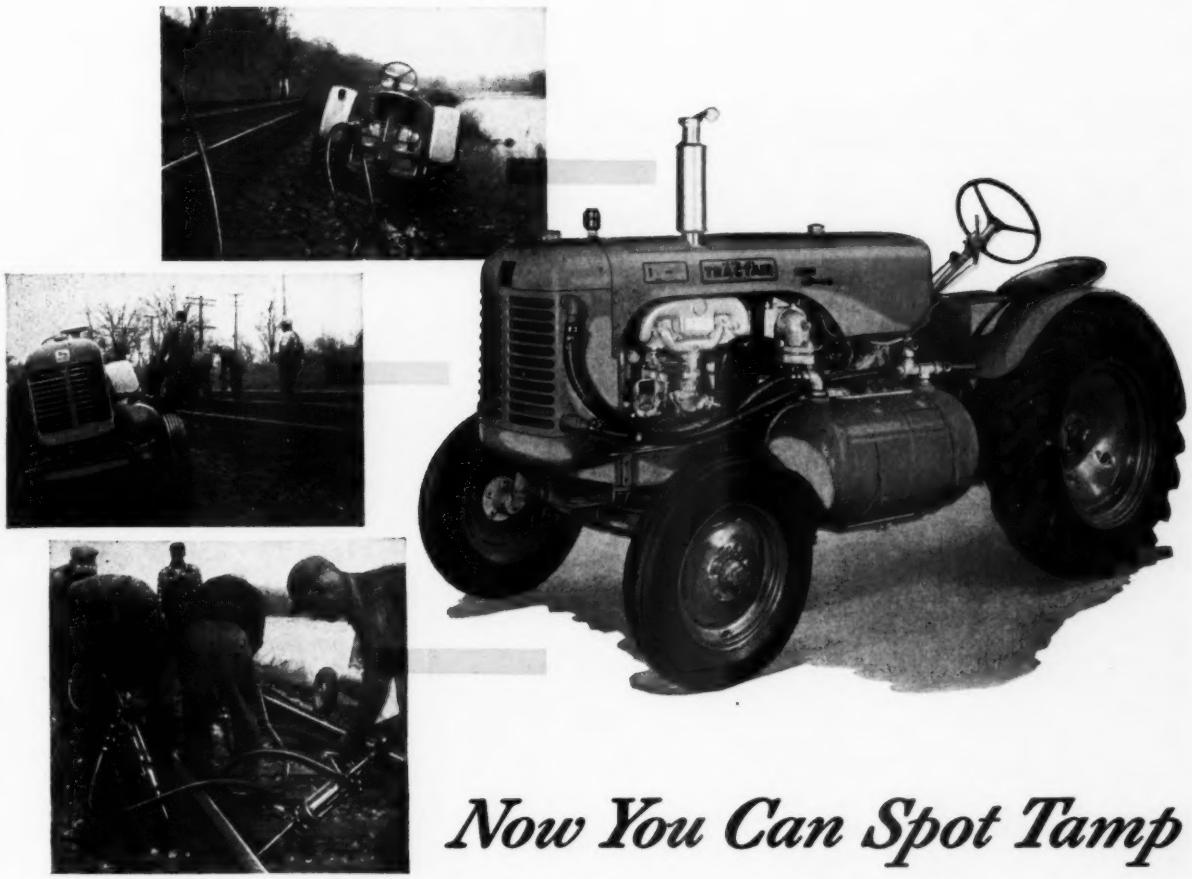
Let us give you the facts and figures as applied to your own conditions.

The R. H. BOGLE Company

ALEXANDRIA, VA.

Memphis Tenn

COMPLETE WEED and BRUSH KILLING SERVICE



Now You Can Spot Tamp ...Quickly and Easily

... the extra power of Le Roi Tractair lets you do faster, better work

SUPERIOR track — that is, a better road bed — calls for good spot tamping. Le Roi with its redesigned Tractair unit, giving you 125 cfm instead of 105 cfm, makes it easy to tamp this superior way.

You see, Tractair's extra capacity gives a greater margin of reserve air than ever before, in operating four, Cleveland C10T, heavy-duty tie tampers. And Cleveland C10T heavy-blow tampers are easy to handle — have a fast, hard-hitting blow that lets your men do a thorough job of tamping in a much shorter time.

You not only save time and money, but you also get a smoother track — one that will stand up longer under the heavy, fast trains of today.

And you can use your Le Roi Tractair, a combination 42-hp wheel tractor and 125-cfm compressor, for many other jobs such as: Handling off-season work for B&B, Signal, T&T, and Water Service Departments. Stockpiling ballast, cinders, and other materials. Driving spikes, breaking pavement. Driving moil points for grouting. Ditching, light grading, and mowing.

The new Tractair can help you reduce the cost of your M. of W. jobs. Write to our Railroad Sales Department, 327 South LaSalle Street, Chicago 4, Illinois, or to us for latest literature.

T-38

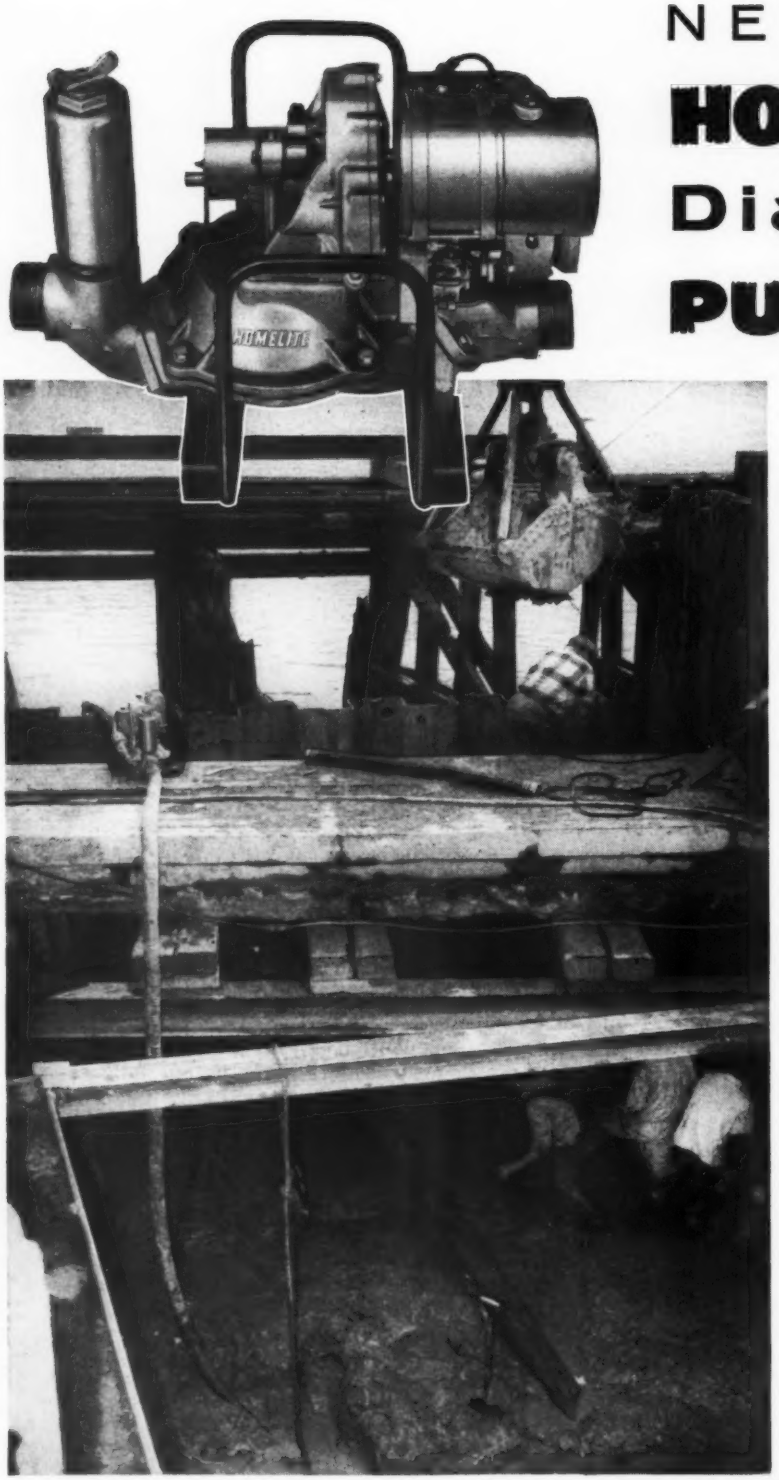
LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 1, Wisconsin

PORTABLE AIR COMPRESSORS · TRACTAIR · STATIONARY AIR COMPRESSORS · AIR TOOLS · ENGINES

NEW

HOMELITE Diaphragm PUMP



for All Heavy-Duty jobs*

This new, job-tested Homelite diaphragm pump will handle *all* your heavy-duty jobs with greater ease and mobility.

Its new internal design not only pumps up to 5000 gallons per hour but handles sand, mud, solids and muck with equal ease. Because it weighs only 120 pounds, it goes anywhere quickly and easily . . . saves money in labor and haulage costs.

The entire unit construction is keyed to smooth, continuous performance. Flapper valves have special self-cleaning action to prevent clogging. The accumulator holds flow at a steady rate. Gears are totally-enclosed for full protection. Spring skids provide steadier footing, reduce vibration.

Write or call your nearest Homelite representative for complete information or a free demonstration.

**120 pounds for easier carrying*

Model 20DP3 has guaranteed suction lift up to 28 feet and total head up to 50 feet, including friction.

Manufacturers of Carryable
PUMPS
GENERATORS
BLOWERS
CHAIN SAWS

HOMELITE

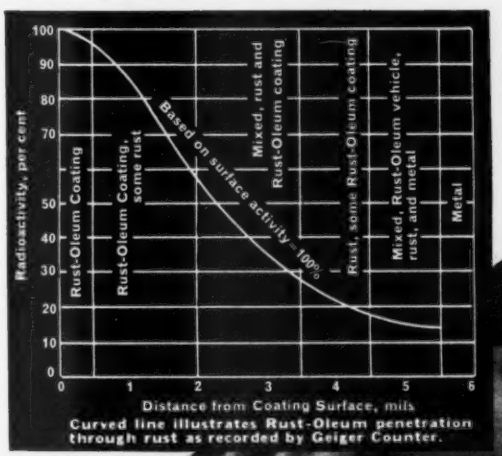
A DIVISION OF TEXTRON AMERICAN, INC.
202 RIVERDALE AVE., PORT CHESTER, N. Y

RUST-OLEUM®

PENETRATION

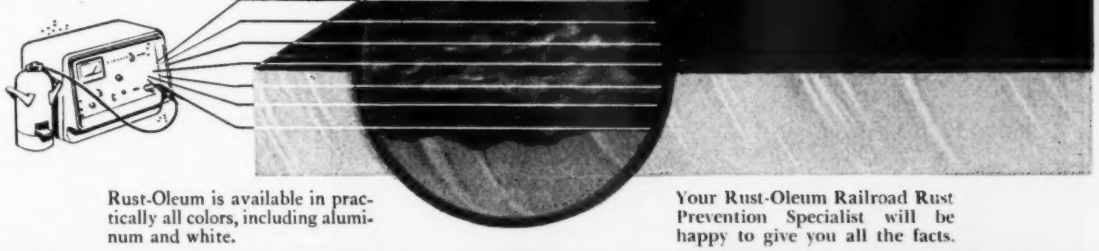
through rust to bare metal traced by Geiger Counter. To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* to bare metal by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same *penetration* enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



Curved line illustrates Rust-Oleum penetration through rust as recorded by Geiger Counter.

There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your Rust-Oleum Railroad Rust Prevention Specialist will be happy to give you all the facts.

RUST-OLEUM®

STOPS RUST!

ATTACH TO YOUR LETTERHEAD—MAIL TODAY

Rust-Oleum Corporation
2546 Oakton Street
Evanston, Illinois

- ☐ Complete literature including color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.

MONOTUBE STEEL PILES

. . . easily extended right on the job

All it takes is a fast, simple weld to extend Monotube steel piles to any required length. Either standard sections, or for added economy, cut-offs from previously driven piles can be used. And while one pile is being extended, driving continues on an adjacent pile. There's *no* lost time!

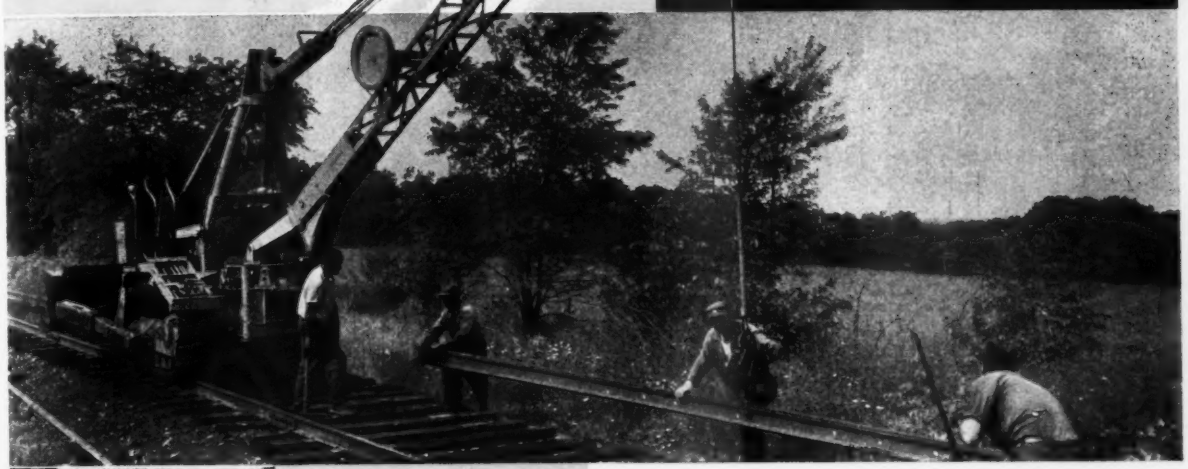
Here's another important point to remember . . . Monotubes combine light weight and ease of handling with cold-rolled strength for *faster* driving . . . and at lower cost! On most jobs, driving can be handled quickly, easily by light, mobile rigs. Find out for yourself how Monotube piles save time and money on *all* types of foundation work. Write today to The Union Metal Manufacturing Company, Canton 5, Ohio, for your copy of Catalog No. 81.

1906 *Fiftieth Anniversary* 1956

UNION METAL

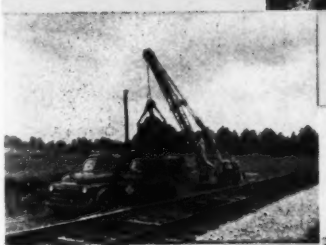
On the Erie R. R. . .

HYSTAWAY®
EXCAVATOR—CRANE
Does four days work in one day



DRAINAGE WORK

HANDLING CONSTRUCTION MATERIAL



RIGHT OF WAY MAINTENANCE

BRIDGE WORK

Handling 112-lb, 39-ft rail, a Hystaway Excavator-Crane mounted on a Caterpillar D6 Tractor, enabled the crew on this branch line to do in **one day** a job that would have required **four days** if hand labor alone had been used.

The Hystaway Excavator-Crane works on or off the tracks, makes right-of-way maintenance a one-machine operation. Unloading and loading rail, laying rail, grading, filling, ditching, handling ballast material are typical of jobs on which Hystaway Excavator-Cranes are reducing costs for Erie Railroad Company.

Call your Caterpillar-Hyster Dealer for details, or write to: HYSTER® COMPANY, 2902-56 N.E. Clackamas Street, Portland 8, Oregon, or 1802-56 N. Adams Street, Peoria 1, Illinois.

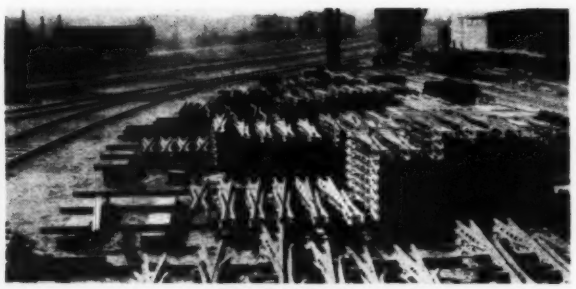
HYSTER COMPANY

"Matched Design" Tractor Tools for Caterpillar-built Tractors

HYSTER

Rail Joints

Bridges

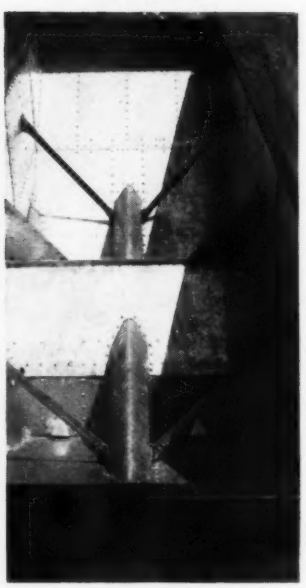


Stored Materials

Signal Equipment

Car Journals

Pipe Protection



Car Construction

Viaducts

Steel Tanks

Street Crossings

There is a DEARBORN NO-OX-ID®
for every railroad application

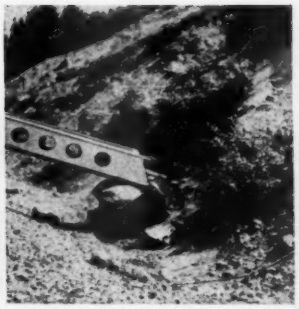
NO-OX-ID PROTECTS . . . NO-OX-ID SAVES

Dearborn® Chemical Company

Merchandise Mart Plaza • Chicago 54, Ill.

❶ **Early morning start.** Railroad Gradall, with oversize track-climbing tires, easily climbs rails to move up the line to first job site.

❷ **First job**—cleaning drainage ditches, working right from roadbed. Gradall's accurate, fast digging action slashes costs on this type of work.



❸ **Complete control** of Gradall's telescoping, arm-action boom and the wrist-like action of the bucket enables operator to grasp and remove even large boulders.

❹ **No traffic interruptions** with a Gradall! When the way must be cleared, the Gradall simply straddles or moves off track while train passes.

Let's spend

A DAY WITH A RAILROAD GRADALL®

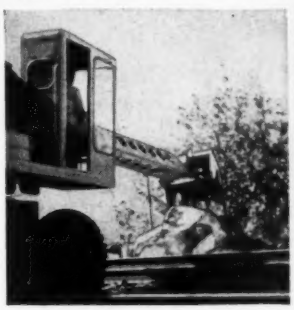
These photos were taken on an actual full-day Gradall demonstration for officials of a leading railroad. They show a few of the many maintenance and construction jobs on which Gradalls have proved real cost cutters for railroads.

❺ **Quickly back on the job!** Gradall cleans culvert openings, working in close around culverts, without damaging pipe, maintaining proper grade.

❻ **Gradall shows its power.** Should a Gradall encounter soft spots, pushing with its powerful telescoping boom will raise carrier wheels to free machine.

❼ **Off to the next job**—right down the roadbed, with ample clearance for passing trains. Where tracks are closer together, Gradall can straddle track.

❽ **Gradall makes fast work** of clearing a rock slide. A special rock bucket, attached in less than 5 minutes, easily handles large rocks.



❾ **Clearing the slide,** the Gradall swings around a full 180°, and "reaches out" across roadbed, to dump rock and build up shoulder on far side.

❿ **Aligning track on curve,** Gradall exerts its powerful hydraulic pressure—pushing or pulling—properly positioning track without moving ballast.

⓫ **Laying rails,** Gradall is used as a crane to quickly and accurately position rails. This is just another of the many "bonus" railroad jobs handled by Gradalls.

⓬ **A full day's work done,** Gradall heads for home. Less than 12' clearance permits a Gradall to easily drive through or even work inside tunnels.

For a Gradall field demonstration on your work, write:
GRADALL DIVISION, WARNER & SWASEY CO., CLEVELAND 3, OHIO

Gradall
DIVISION OF WARNER & SWASEY *Cleveland*
PRECISION MACHINERY SINCE 1880
® Reg. U. S. Pat. Off.

YOU CAN DO IT BETTER, FASTER, FOR LESS WITH A GRADALL

RAILWAY
TRACK and STRUCTURES

Subject:

Dear Readers:

Need for Loyalties in Business

People today have a vastly different attitude toward their jobs and their employers than they did 10 or 15 or more years ago. It seems to us that the average worker, partly because of outside forces and partly because of his own desires, is being squeezed into a smaller and smaller circle of interest insofar as his job is concerned. There seems to be a growing tendency for people to avoid any feeling of responsibility for happenings outside their immediate duties. Also, there are indications that many workers, rather than having a feeling of loyalty toward their employers, are more apt to be resentful or even hostile.

Why do these attitudes exist on such a wide scale? The answer, it seems, lies largely in the fact that workers are more highly and extensively organized than ever before. One result has been a sharper division between skills or crafts, with individual workers being required to confine themselves to a single line of activity. For instance, a carpenter cannot lay bricks and a plumber cannot do any electrical work.

Under these circumstances it is understandable that workers should develop a narrower viewpoint toward the overall operation in which they are engaged. When problems arise that are not in the immediate sphere of activity of a worker the common reaction today is summed up in the words, "That's not my problem," usually accompanied by a shrug of the shoulders. If a man is prevented from having an interest in the activities of the worker at the next bench, how can he be expected to develop much concern in the welfare of the company he works for?

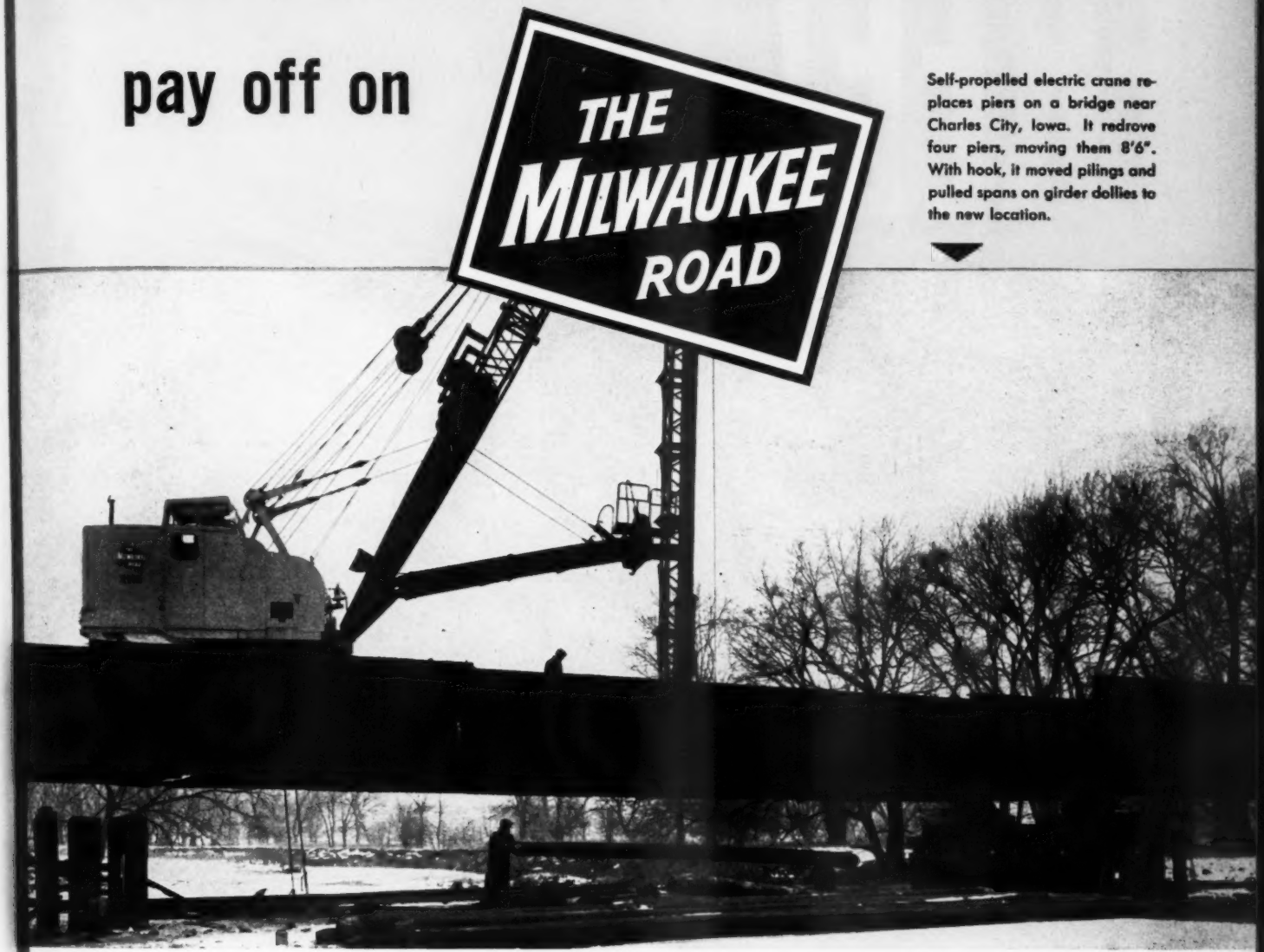
Another influence causing a separation of interests between employees and employers is the hostile attitude of many union officers toward business enterprises. The impression they give is that the relationship between workers and employers is a constant battle, and that there is no area in which the two groups have common interests.

One effect of these changing attitudes on the part of employees has been to deprive the individual of the feeling that he is engaged with his employer in an enterprise whose success is essential to both parties. There is a basic need in every individual to align himself in groups with common objectives. Business enterprises would seem to offer an ideal situation for the fostering of mutual loyalties between employer and employee. If a worker is to have security in his job the company for which he works must have a comfortable spread between income and outgo. Yet it is common practice these days for organized workers to make demands which, if granted, would place their employer in serious financial difficulties, even endangering his ability to employ the very people making the demands. Nowhere can this phenomenon be seen more clearly than in the railroad industry.

There can be little disagreement with the statement that this situation is basically unhealthy and that its continuance will ultimately lead to serious difficulties for both workers and employers. This realization, if deep enough, should be sufficient to cause an awakening on both sides, leading to a determination to seek common ground for the settlement of future differences.

MHD

CAT*-powered diesel electric cranes pay off on THE MILWAUKEE ROAD



Self-propelled electric crane replaces piers on a bridge near Charles City, Iowa. It redrove four piers, moving them 8'6". With hook, it moved pilings and pulled spans on girder dollies to the new location.

THE Milwaukee Road has three self-propelled diesel electric cranes powered by modern heavy-duty Caterpillar Railroad Diesels. Here's their record:

1. **One of the self-propelled units traveled to a typical job, worked 10 hours and returned, using only 30 gallons of locomotive fuel.**
2. **Because the self-propelled cranes travel at 18 MPH, the road is getting more work per day.**
3. **The cranes are not hindered by low temperatures or scarcity of water.**
4. **They drive piles—or when equipped with clamshells, excavate—or when equipped with hooks, handle materials and equipment.**

The heart of these Industrial Brownhoist Cranes are rugged Cat D326 Diesels. They drive GE traction generators supplying current to two double-reduction, axle-mounted motors. Each D326 also drives a compressor and exciter generator.

Shifting of leads for driving battered piles is done with a 110 PSI air motor with cab control. The unit is equipped with an eddy current clutch which prevents cable breaks when dropping the 5000-pound hammer.

When you order new equipment or repower old equipment, specify efficient, high-production Caterpillar four-cycle Railroad Diesels. They'll help you eliminate parts inventory because your nearby Caterpillar Dealer stocks the parts for you. See him soon. In his complete range of diesel engines and electric sets, up to 520 HP and 315 KW, is the exact diesel power for your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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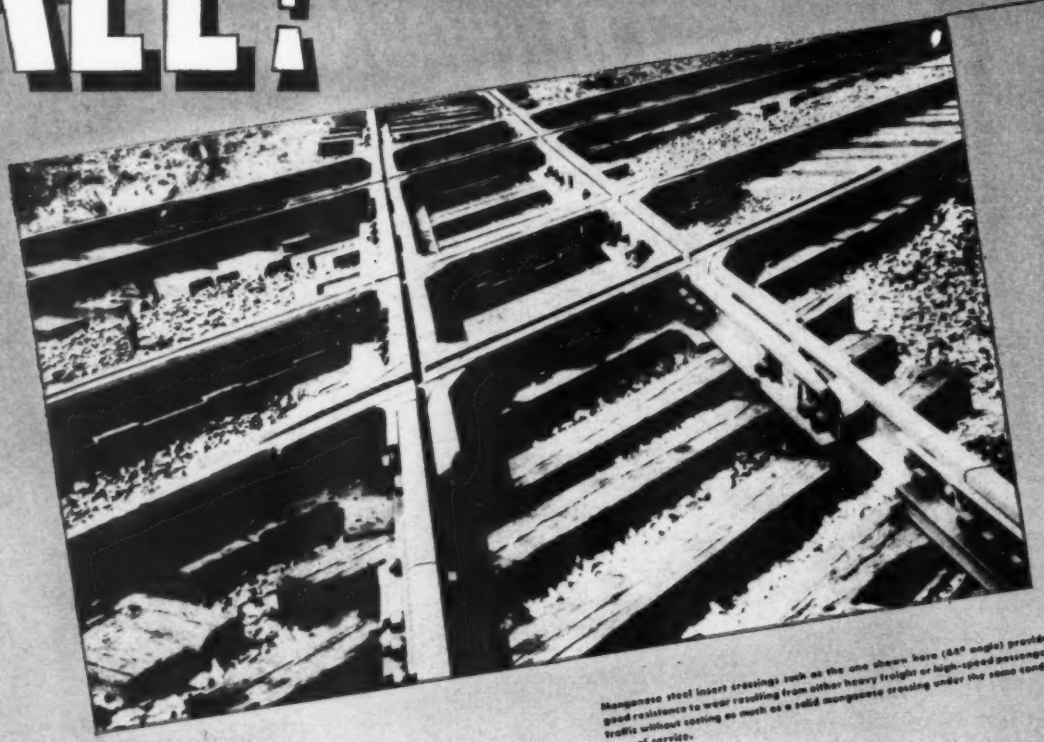
MODERN HEAVY-DUTY RAILROAD POWER

FREE!



Manganese steel insert crossings such as the one shown here (44° angle) provide good resistance to wear resulting from either heavy freight or high-speed passenger traffic without costing as much as a solid manganese crossing under the same conditions of service.

22

Contains data, photographs, and diagrams on USS TRACKWORK products

This 128-page "USS TRACKWORK" catalog consists of five sections:

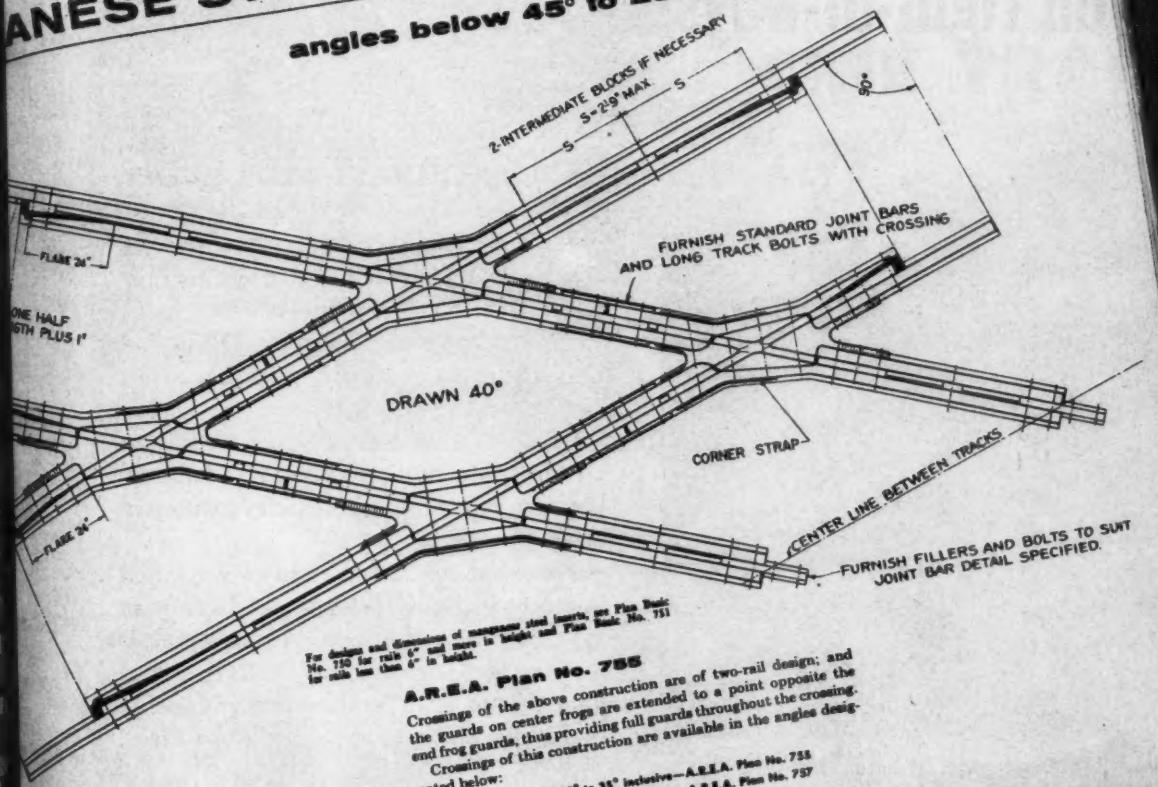
1. **INTRODUCTION**—describes the care and control that goes into the manufacture of quality trackwork.
2. **CROSSINGS**—offers full information on Bolted Rail Construction, Manganese Steel Insert Construction, Solid Manganese Steel Construction; photographs of assembled structures plus detailed diagrams bearing angles and dimensions.
3. **FROGS**—contains complete photographs, descriptions, numbers, angles, and diagrams of all U.S. Steel Frogs and Tie Plates.
4. **SWITCHES**—complete listings of many types of switches made by U.S. Steel, plus Switch Points, Slide Plates and Braces, Switch Stands, Switch Rods and Clips, and Industrial Turnouts. Photographs and detailed diagrams included.
5. **MISCELLANEOUS**—lists parts nomenclature, ordering information, weights, mathematical details of structures, etc.

UNITED STATES STEEL

TRACKWORK CATALOG

ANESE STEEL INSERT CROSSINGS

angles below 45° to 25° inclusive



For design and dimensions of manganese steel inserts, see Plan Basic No. 751 for rails 6" and more in height and Plan Basic No. 751 for rails less than 6" in height.

A.R.E.A. Plan No. 755

Crossings of the above construction are of two-rail design; and the guards on center frogs are extended to a point opposite the end frog guards, thus providing full guards throughout the crossing.

Crossings of this construction are available in the angles designated below:

Angles Below 45° to 35° inclusive—A.R.E.A. Plan No. 755
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23

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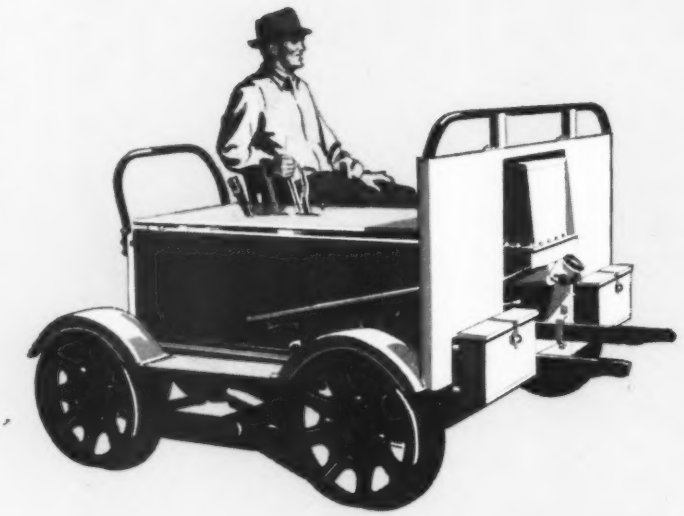

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TRACK and STRUCTURES

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A Look at the Building Problem

The railroads have a problem in the provision of buildings that are adequate and suitable for serving their particular requirements. Is there a road that does not have numerous structures that have long since become obsolete?

Yet, in spite of the unsatisfactory condition, appearance, or location of these buildings, many of them are being continued in active use. Why is this so? Simply because, in most cases, management feels that it cannot afford the cost of new buildings.

It is pertinent to inquire if railroad engineering departments have in all cases explored the possibilities of solving this problem by the appropriate use of economical forms of construction. Types of structures have been developed which are much more economical than conventional forms of construction.

Several months ago this magazine carried an article describing a design for small stations that had been developed on the Wabash. These structures are of precast concrete construction and are proving highly economical and otherwise satisfactory. In this issue is an article describing a large freighthouse of prefabricated construction that has been built by the L&N and the NC&StL. A prefab type of structure was chosen for this building primarily because of its economy.

The point is that a railroad need not continue to occupy unsatisfactory buildings simply because it cannot afford the cost of new structures of the conventional type. Perhaps the use of one of the newer forms of construction will get the cost down to a point where management will be impelled to give its approval.

Keep Your Powder Dry

The trend in recent years has been toward the use of larger machines of the on-track type for track maintenance work. Some of the new units that have been introduced for doing specific jobs are larger than existing machines for performing the same tasks. In addition, there is a tendency to combine several functions in the same machine.

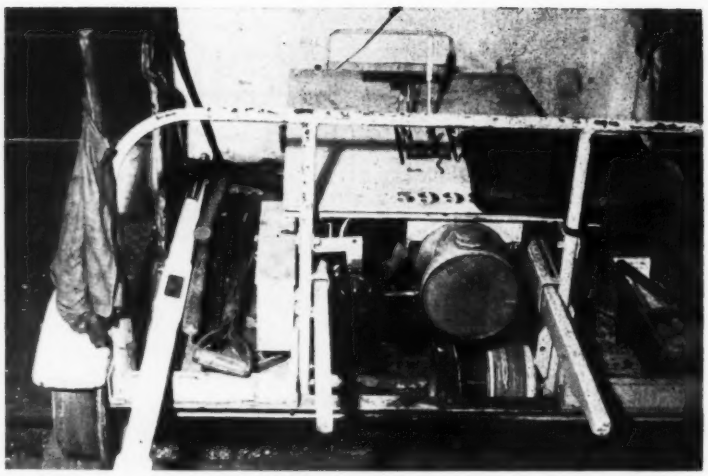
This is a healthy trend and it should be encouraged. It is obvious that important economies lie in the direction of multiple-purpose units. But even so we should not allow ourselves to lose sight of the fact that there are still situations, and many of them, in which there is a paramount need for lighter or portable on-track units and for off-track machines.

There are two general situations in which such equipment has important advantages. One of these is for out-of-face track-maintenance tasks on railroads where agreements with the operating brotherhoods result in costs being excessively high for the operation of on-track equipment. The other is the need for mechanizing small gangs whose work is largely of the spot type or which are too small to handle the larger units of equipment. The great majority of roads still have section gangs, or their equivalent, and it is still necessary for them in most cases to carry out maintenance tie renewals and to do spot-tamping work and similar tasks.

In this age of mechanization it is no longer necessary to argue the benefits of using machinery. That phase has long since been left behind. What is needed now is a careful appraisal of the requirements for machinery and of the types that will give the best results under certain conditions.

In filling their equipment needs maintenance officers now have a selection of machine types for almost every task. Many of these officers are exhibiting an admirable degree of flexibility in revamping their equipment setups as new types become available. Those who hold to a rigid policy may wake up one day to find they have been overlooking opportunities for important economies.

BEFORE LEAVING on his trip, the motor-car patrolman must be familiar with train schedules.



BASIC TOOLS, bolts, spikes and plugs for carrying out most emergency jobs, as well as flagging equipment, are stowed on the trays of the motor car.

How to Make a Track Inspection

Part I

By L. C. Blanchard
Roadmaster
Milwaukee Road
Minneapolis, Minn.

Although most railroads have rule books and instruction pamphlets stating what items of the track structure must be inspected at stated intervals, these do not outline the inspection procedure. In this, the first of two articles, the author deals with the track patrolman, his equipment, and what he should look for when inspecting track. In the second installment he will deal with the inspection of turnouts, highway crossings, bridges and culverts, and the supplementary inspections that are made to assure safe conditions.

A WALKING INSPECTION will necessarily be confined to shorter distances.

● Who is it that inspects the track over which we ride with such confidence? Surprisingly enough, just about everybody who has occasion to cross over, walk near, or ride upon a railroad track is an inspector of track. People who have no connection with the railroad often call the office to report rough spots, broken rails, bolts out of joints, track loose in spikes, poor ties, washouts, and fires on the right of way. Train and enginemen, linemen, bridge and building men, welders, supervisors, local officials and general officers are all prolific spotters of track defects. It is well that this is so. It is not possible to have too many eyes watching the track for defects. The smart track supervisor encourages it to the fullest extent.

The Track Patrolman

Track inspection is the primary responsibility of the track foreman. It starts with the track patrolman and progresses with varying degrees of responsibility through the track foreman, the roadmaster, the division engineer or superintendent to the highest officer on the railroad.

Since track inspection starts with the track patrolman, just who is he, how did he get the job, what are his qualifications and how does he go about his work?

Definite Assignment

A track patrolman is a man assigned to inspect track within certain defined limits. He may be a walking inspector and have one or more miles of track to inspect daily. He may be a section foreman in charge of a section ranging in length from 6 to 30 miles. The track patrolman may be a man assigned to operate a track motor car over an assigned territory of up to 100 miles. He may be a promoted laborer answering directly to the track foreman and assigned to patrol or inspect track.

To qualify as a motor-car track patrolman a man must usually have served an apprenticeship of from one to five years as a section laborer to familiarize himself with the details of the work. First he learns how to make repairs under the direction of a foreman and from this experience he learns what to look for as an inspector. If he shows aptitude for the work and a desire

BRAKES of car are checked to be sure they are in good working order and car can be stopped at highway crossings.

to learn, they are noticed by his superiors and he is encouraged to ask questions.

Other steps also are taken to speed his education. He is taught to raise track so that he will recognize a dangerous soft spot in the track when he sees one. He is allowed to ride or follow the rail detector car so that he will recognize dangerous rail defects by the discoloration or other visual means of detection. He is taught to line track so that, by watching the line of the rail as he rides over it, his trained eye will quickly spot trouble from out-of-level track or wide gage.

Must Know Rules

When he has earned the confidence of his foreman, he will be recommended to the roadmaster for consideration when there is an opening for a track patrolman's job. If this is a motor patrol and he is the successful applicant, he must further qualify by passing rigid physical and rules examinations. He must have good vision and no serious physical disabilty. Under the rules he must know how to operate his car safely and how to properly detect a defect in the track, should one be found. This means that he must understand and be able to execute perfectly the flagging rules of his road. He must be able to communicate with the dispatcher by phone or written message.

When he has qualified for the job under the rules and is to be given the opportunity, he will then be given up to 30 days in which to prove his ability to handle the job. During this time he will be watched closely for signs of carelessness, lack of diligence, ineptitude or any indication of unfitness. This man carries on his shoulders the responsibility for the safety of all of those who ride on the rails. It is important that he be qualified.

Track inspection is an all-inclusive affair encompassing everything within the right of way limits and includes such things as the condition of the rails, rail fastenings, ties, ballast, roadbed, openings under the track, brush and weed conditions, clearances, signals, telegraph lines, right-of-way fences, ditches, potential slide conditions, overhead structures and many others. The better-trained and the more alert a track inspector is, the more things he can see that are in need of correction. Management is constantly imploring employees to train themselves to see what they are looking at. Putting it another way, "you can't fix it, if you can't see it."

Let's take a trip with the motor-car patrolman over a stretch of track and analyze inspection procedure from that standpoint.

Assuming the inspection is to be made from a track motor car, the first thing is to check the motor car for proper flagging equipment in accordance with the rules. Next, check to see that such basic tools as a claw bar, spike maul, track wrench, gage, adze, track shovel, light track jack, along with a supply of track bolts, track spikes and tie plugs are properly stowed on the car. He will thus be equipped to take care of most emergency jobs that can be handled by a man or two. Next check the brakes on the car to be sure they are in safe working order. One should know for certain that he can stop when approaching highway crossings.

The first concern of a track inspector is the condition of the rail. Being able to spot a vertical split head, a horizontal split head, a head-and-web separation or a piped rail by the discoloration, bulging and other signs is an art that can be developed to a high degree through conscientious attention. A manual should be shown or furnished to each inspector showing pictures and descriptions of the various defects so that he can familiarize himself with them and know what to look for. Sperry Products, Inc., prints a manual that is excellent for this purpose. The roadmaster might accumulate a number of sample sections of rail containing representative defects and hold a class of instruction with his inspectors.

In general a track inspector should stop and examine carefully any rail that shows a peculiar dark streak for any length along the top of the rail, or any odd-appearing widening or flattening of the ball of the rail. He should look underneath the ball of the rail for any signs of cracks or of bleeding rust stains and along the edge of the ball of the rail and the web of the rail for any signs of bulging, rust bleeding or hairline cracks.

A rather common rail failure is a base break in the shape of a crescent or half moon. If it is on tangent track and short enough to be covered by a pair of angle bars and only one such break is in the rail, it is permissible on some roads to bolt on the angle bars to protect it against further breaking. Should there be more than one of these breaks in one rail length, it indicates a base seam may exist in the rail that will lead to still more breaks in that rail. It is necessary to remove such rails from the track.

A vertical hairline crack along the outer or inner edge of the ball of the rail may indicate a detailed fracture or a transverse defect. Such a defect is extremely dangerous because the rail could crumble into a number of pieces. When such a rail is found, the track patrolman must protect it with flags and a slow order, then have the rail removed from the track as soon as possible.

Use of Flaw Detectors

Most railroads are now using detector cars, one or more times each year, for finding hidden defects in rails. These cars also find many defects that are plainly visible to the eye, once they are located. Besides the regular crew of inspectors, these

ULTRASONIC DEVICES, for locating defects at rail ends, are also being increasingly used as a means of inspection.

BALL OF RAIL should be examined underneath whenever it shows a peculiar dark streak or signs of flattening.

cars are usually accompanied by the roadmaster or other competent track inspector. Since visibility is excellent from the cabs of these cars, which travel at low speed, it is a fine opportunity to supplement the regular track inspection by the patrolmen.

Another inspection practice that is increasing in mileage covered each year is the use of an ultrasonic testing device. This is an instrument which is used for locating rail defects within the joint-bar limits, such as bolt-hole cracks, broken ends, split ends, horizontal defects and head-and-web separations. This instrument should not be depended upon to locate transverse defects such as fissures. While the device is intended primarily for spotting defects within the joint fastening area, it is also employed on switch points, rails through street crossings and any other place where the detector cars are unable to operate satisfactorily. Since two men are involved in this operation, and it is a walking inspection, they have a fine opportunity to observe other conditions which could lead to trouble, such as corroded track spikes, spreading track, loose bolts, cracked joint bars, failed rail anchors and worn or broken switch parts.

Watch Those Joints

Next in importance to the condition of the rail itself, is the condition of the angle bars and bolts. It is a common thing on track inspection to find one or more bolts missing. These should be replaced immediately. As soon as one bolt breaks it puts added strain on the remaining bolt or bolts so that they may soon give way also. This in turn allows the joint to pull apart in what is called an "open joint." Once a joint opens two inches or more, the rail ends take a severe pounding from the car wheels which will shortly ruin the rail and possibly set up a dangerous condition. It takes time and a lot of hard work to pull the ends back together again, so the patrolman should make it a practice to replace all missing bolts the same day they are found.

A skilled track inspector can check all rail joints for missing bolts at motor-car speeds up to 15 mph. He can check for missing bolts on just one rail at even higher speeds. When more than one man is on a motor car it is regular practice for at least one of them to watch the bolts.

Cracked or broken joint bars are difficult to see from a moving track car so it is good practice to make an occasional walking inspection. A pair of broken angle bars are just as dangerous to a moving train as a broken rail, and should be protected in the same manner. Usually angle bars break progressively over a period of several days or weeks. A crack first appears near the top of one bar where the two rails join, or over a bolt hole. It then progresses downward until it is fully broken. An additional strain is then placed on the remaining good bar until it, too, breaks. An alert inspector can usually spot these before complete failure takes place.

Anchorage Needs Attention

Track to be well maintained must be well anchored. Each railroad has a standard plan for the application of rail anchors, with so many applied per rail length for each class of track and weight of rail. To function as intended they must be properly applied and frequently inspected. Some types fall off the rail if they are not driven far enough to engage the notch. Some have been overdriven and damaged. Some are affected by the pressure of frozen ballast against the bottom of the anchor. Each type has its own characteristics, but all of them bear watching.

A good time to check these is while making a walking inspection of the track. Count the number per panel at frequent intervals. Watch for signs of the anchor sliding on the rail. If the crossties are skewing or moving in the ballast it may indicate not enough rail anchors have been applied to hold the rail at that location, or it may be that the anchors have been applied on the wrong side of the ties. Any such condition should be promptly reported and handled for correction.

To the track inspector a matter of constant concern is the danger of spread track. The lighter the rail and the older the ties and other fastenings, the more danger exists.

RAIL ANCHORS should be observed frequently to see that they are properly applied. Loose anchors should be reapplied.

SPREADING TRACK is a matter of constant concern to the patrolman and he soon learns where to check the gage.

Track is most likely to spread where there is a heavy thrust from cars or locomotives due to the track being out of level or badly out of line. To spot such conditions the trained observer watches the line of the track on one rail. As soon as he sees a kink or a spot of bad line, he checks the opposite rail to see if it has exactly the same kinks. If not, he then tests with a track gage or a steel tape to make sure it measures exactly 4 ft 8 ½ in, or 56 ½ in, from gage face to gage face.

He also observes the condition of the track spikes, as any looseness will indicate movement of the rail under load. This is extremely dangerous and must be corrected at once. It is not enough to spike the track back to gage: The condtion that caused the spreading should also be corrected. This usually involves leveling and lining the track.

When track is filled with snow, spreading track often can be detected by the condition of the snow against the rail. If it appears loose and shaken, the snow should be swept away and the spikes, plates and ties examined. Spreading track often can be detected even though partly buried in dirt by the shaken appearance of the dirt along side the rail.

Ice Can Cause Trouble

In the wintertime there is another dangerous condition to watch for and that is ice forming on top of the tie plates and under the base of rail. It has the effect of lifting the rail up and out of even double-shouldered tie plates. Should this condition develop in a curve it can be downright dangerous.

A quick cure is to spread a small amount of salt along the base of the rail. Some will object to this on the grounds of corrosion, and admittedly the repeated use of salt would have a detrimental effect on rail, plates and spikes. However it remains to be proven that a single application of salt under the above conditions is not the best way out of a bad situation. If this icing condition should become chronic, some better way of handling it should be devised.

On many lines, ties are no longer the problem they were a few years ago. It is a responsibility of the track inspector to know that the tie condition is safe for the loads to be supported. A broken or rotted tie among other good ties is no cause for alarm. However, three bad ties adjacent to each other is cause for alarm and any greater number is dangerous. Two bad ties under a rail joint leave that joint without adequate support and may cause the angle bars to break, and that is just as serious as a broken rail.

There are many types of ballast and each has its own characteristics. However, pumping joints can be common to nearly all kinds. This is something for which the track patrolman should watch during wet weather and he should report excessive pumping to his superior.

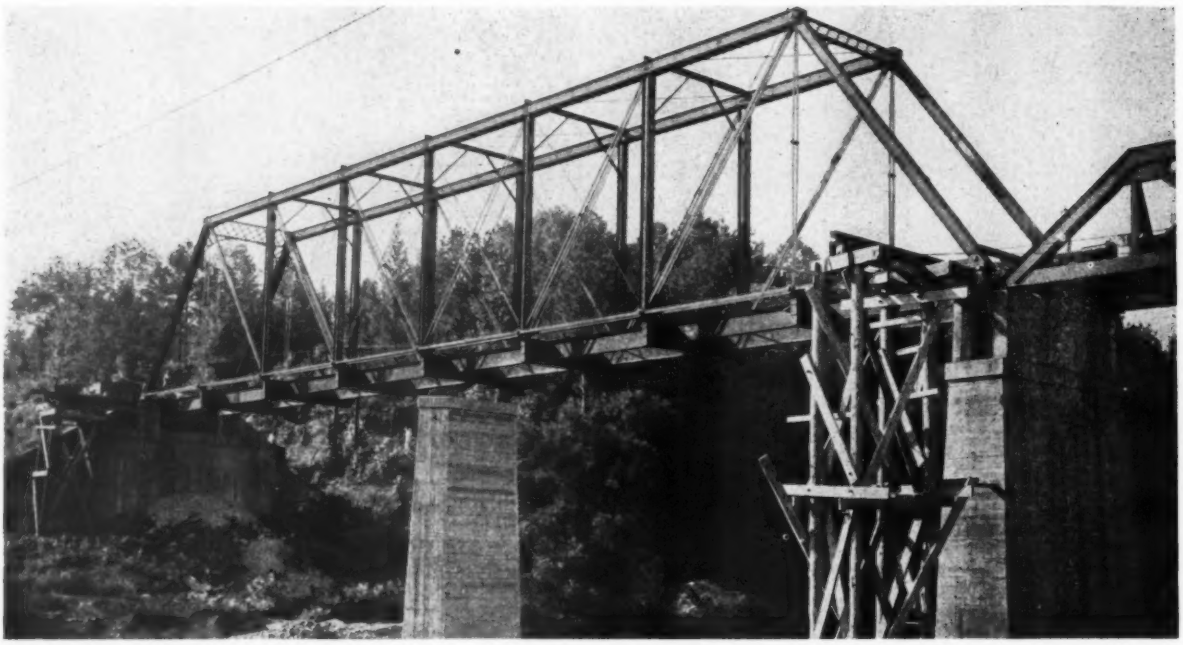
Track drainage ditches are made with a ditching machine or by other methods. These should be watched closely for signs of scouring of the track shoulder or for obstructions that might divert the water against the track with the possibility of undermining the ties.

BROKEN BOLTS are not unusual and they should be replaced immediately.

Bear in mind that it is the duty and the responsibility of the track patrolman to catch the first faint signs of trouble and see that it is corrected before it can become real trouble. Track patrolmen have a tremendous responsibility and the good one have a sense of pride in their ability to see what should be seen.

(Part II of this article will appear in an early issue.)

How One Span Was Replaced . . .



ABUTMENT and pier of this old truss on the Norman sub-division have been recapped as necessary and a center pier has been built to support the adjacent ends of the replacement turntable girders. To clear way for the girder placement, the old span will be lifted onto the falsework and dumped into the stream in the clear of the piers.

Back to Work . . .

Turntables Have New Job

Retired turntables are finding new employment on the Missouri Pacific. Modified so as to be used as bridge spans they are being installed on branch lines to replace older structures that are considered inadequate for the present-day burden of traffic.

● What is being done with all the turntable spans that have been retired because of dieselization? Here's what one railroad is doing. The Missouri Pacific is engaged in a branch-line bridge-renewal program using ex-turnable spans. They are replacing bridges that are somewhat antiquated and not sufficiently strong to bear the burden of modern traffic.

How They Are Modified

In the course of dieselization on the road, 48 turntables at various points were no longer needed. Investigation showed that 20 of these spans could be adapted for use as bridge spans with some modification. By providing shoes at the ends of the girders and introducing new bracing and cross frames, the turntables would be usable as bridge spans. New bracing and cross frames were necessary because the center-to-center spacing of the turntable girders was too narrow for bridge requirements. It was also necessary to add cover plates to the turntable girders if they were to be used on lines having a Cooper's E-45 rating or over. The cover plates are needed because of the redistribution of stresses that takes place within the girders when the location of the bearings is changed.

All of the modification work on the girders is done by system steel gang forces at centrally located points on the road where shops and supplies are readily available. They are then loaded and shipped to the job site for installation and field fabrication as bridge spans. So far, nine bridges have been renewed over the system in this manner and all have been on branch lines.

The Norman subdivision of the Arkansas division has been the scene of a bridge-renewal program involving the use of converted turntables. It has a number of old steel spans over watercourses that stream down from the Ouchita mountains. The expense of replacing these spans with new steel was more than could be justified by the traffic carried. Use of the displaced turntable spans offered a means of replacing the old structures with spans adequate for the purpose. As

CRASHING and grinding amidst a cloud of water spray into the stream, the old 177-ft pin-connected truss span will be recovered later and sold for scrap.

TURNTABLE girder, which has been modified for use as bridge span by system steel forces, is lowered into place. Pony truss span at right is part of old bridge and not replaced.

a result, the subdivision can boast of four such bridge spans recently installed.

One of the bridges involved in the program on the Norman subdivision is Bridge 46 where the railroad crosses the Caddo river near Glenwood, Ark. This structure consisted of a 177-ft through pin-connected truss span and a 74-ft pony truss span. In the rehabilitation work, the pony truss span was left in place but the 177-ft span was replaced by two converted turntable spans, one from North Little Rock, Ark., and the other from Van Buren, Ark. As turntables, these were 100-ft spans. In the conversion work they were strengthened and modified to lengths of 89 ft-6 in.

The concrete piers which supported the old truss were recapped as necessary to receive the new deck-type spans. In addition, it was necessary to construct a concrete center pier to support the adjacent ends of the turntable girders. All of this work was done without delaying traffic.

Old Span Dumped in River

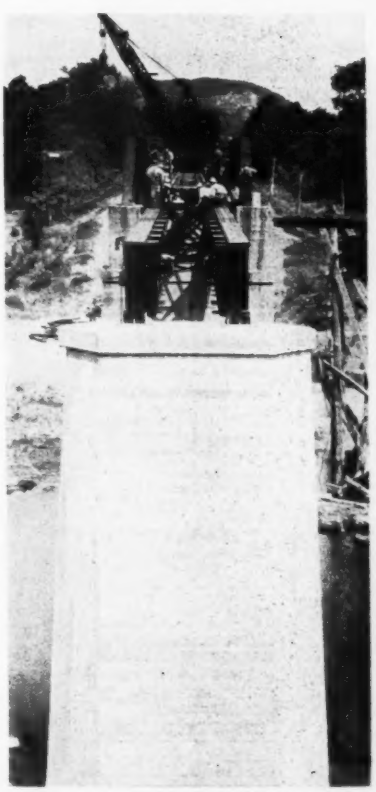
To remove the old truss span, untreated falsework was driven beside each of the piers supporting the truss and two transverse steel rails were placed on top of each set of falsework to act as a skidway. The truss, which had been stripped of rails and ties, was lifted out of position and placed on the falsework. From that position it was dumped into the stream in the clear of the piers to be recovered later. Everything was now ready for the placement of the new bridge structure.

The two turntable girders, comprising one of the new spans, were placed in position with a crane between the center and one of the end piers. The new bracing and cross frames were quickly bolted into place and the ties and rails restored so that the second set of girders could be positioned.

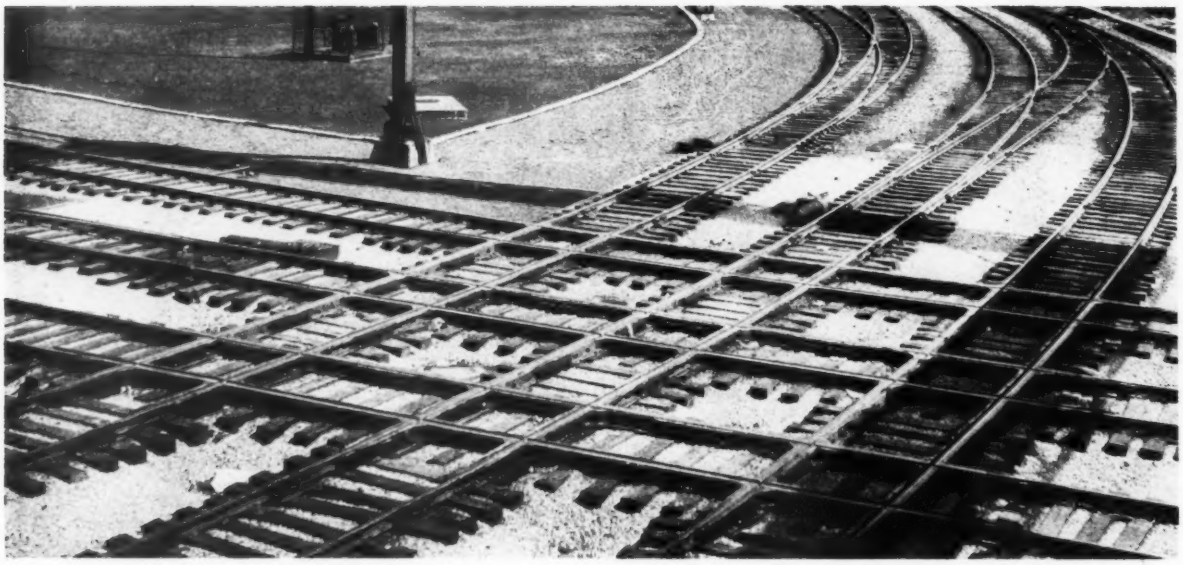
Thus, a deck plate-girder bridge, built for Cooper's E-50 loading, was available for service, giving increased carrying capacity to the line.

Reclaimed From Many Points

At other points on the road where like bridge renewals have been made, steel from turntables at Kansas City, Mo.; Omaha, Neb.; Wichita, Kan.; Cotter, Ark.; Glencole, Mo.; Jefferson City, Mo.; and Atchison, Kan., have been used. The old spans replaced have been sold for scrap.



BRACING and cross frame members are quickly bolted into place. The new girder spans will have Cooper's E-50 rating thus increasing the line's capacity.



GOOD DRAINAGE, sound ballast and adequate maintenance are important features contributing to the satisfactory condition of this heavily traveled crossing at entrance to the St. Louis Union Station. Note man-holes for collecting surface water.

Railroad Crossings . . .

Survey Shows Preferred Maintenance Practices

By V. C. Hanna

Chief Engineer
Terminal Railroad Association of St. Louis

Prevailing practice in the maintenance of crossings at grade is summarized and analyzed in this article which is based on an address delivered before a recent meeting of the Maintenance of Way Club of Chicago. Information received from 39 roads indicates general agreement on some phases of the subject but wide variations in others.

● I was recently afforded the opportunity of investigating, on a nationwide scale, the methods and practices currently being followed in connection with the maintenance of railroad crossings at grade, and to secure individual opinions on all phases of this interesting and important subject from system engineering and maintenance-of-way officers, division officials and field supervisors, representing 38 railroads, both large and small, throughout the United States.

While there was general agreement on many phases of the subject, on many others there was a wide variance in practice, methods being followed and individual opinions. Even more interesting, was the difference in results being obtained from similar installations. It is quite evident that varying conditions of subgrade, available ballast, intensity of traffic, predominant speed and other such factors have resulted in the maintenance of each crossing as an individual problem. It is doubtful if a standard procedure will ever be agreed upon or would even be practical or desirable. However, I strongly believe that much improvement in our maintenance methods may be secured from a study of the experience of our contemporaries who, by their ingenuity and experiments, have developed successful and economical maintenance practices.

Subgrade Drainage Important

It is considered highly important that the subgrade be composed of stable material and kept well drained. In many cases where the subgrade material has ceased to provide a stable and suitable foundation, due to lack of drainage, the material has been entirely removed in varying depths, averaging about two feet, and is usually replaced with clean ballast of the same type as that in use on the adjoining track. The preference seems to be for clean hard stone, furnace slag, trap rock, or similar material, varying in size from a minimum of ½ in to a maximum of 2 in.

At the time the subgrade is renewed, or even when ballast is renewed out of face, installation of mechanical drainage has been found to be most helpful. Where natural drainage is not present it has been found quite satisfactory, in many instances, to use perforated pipe and extend it from all corners of the crossing to an open ditch, or to a sump or dry well if the sur-

For Better Railroad Crossings

What's Needed	How to Get It
Stable support	Suitable properly drained subgrade Concrete subgrade slabs Pressure grouting Clean tough ballast, power tamped Adequate timbering
Better anchorage	Provide more anchors Extend length of approach anchorage
Improved joint maintenance	Make frequent inspections Keep bolts tight Keep joints well supported and tamped Use insulated joints of good design Reduce use of insulated joints, compromise joints and taper rails to the minimum Use canted abrasion plates under insulated joints
Corrective flangeway and point maintenance	Do more grinding and less welding Remove metal flow before chipping occurs or flangeways narrow Maintain accurate gage and alinement

rounding area is quite flat. There is almost unanimous agreement that proper drainage is probably the most important single factor in the maintenance of a railroad crossing.

About one-third of the reporting railroads have used concrete slabs under certain crossings, and the majority are well satisfied with the results obtained. The slabs vary in design, all are reinforced and the average thickness is 12 in. Best results have been attained where they have been placed at least 2 ft below the bottom of the ties or timber supporting the crossing.

Pressure Grouting Successful

The modern method of pressure grouting has been used by a number of railroads and the results have been uniformly successful. The depth to which grouting points should be driven is governed by prevailing conditions at each crossing. It is generally agreed that the grout should be kept a reasonable distance below the tie or timber to avoid too rigid support of the crossing.

The ballast used is generally the same as that used in the adjoining track. The majority prefer hard clean rock, slag or similar tough material 1½ in in size although others favor sizes varying from ½ in to not over 2 in. A minimum of 9 in of ballast under the timber is preferred and it is generally dressed from 1 in to 2 in below top of tie at center of track and from 2 in to 3 in at the ends of ties. There is complete agreement as to the desirability of using power tampers, for surfacing and even spot maintenance. Both the air and vibratory types have been found to be satisfactory.

Timbering of Crossings

A number of railroads use different sizes of ties and timber which they claim are quite satisfactory but the large majority conform generally to the recommended standards of the American Railway Engineering Association. However, there is general use of two or three 7-in by 9-in, 7-in by 10-in, and 7-in by 12-in grade and switch ties, or 8-in by 10-in and 12-in by 12-in timbers, bolted together and placed under each rail in the track of greater importance considering speed and amount of traffic. This arrangement forms a support 18, 20, 24 or 27 in wide, which has proved to be adequate.

There is also some use of a frame or timber pad, composed of two or three of these ties or timbers bolted together with corners secured by metal bands, placed under all four sides of the crossing. On the other hand, one large system uses all 7-in by 9-in ties of varying lengths, with practically uniform spacing of 20 in, in crossings with angles of 90 to 60 deg and smaller.

Treated hardwood ties and timbers are generally preferred, although some use is made of untreated white oak at several heavy-duty locations where mechanical wear is the cause of removal rather than decay. Spacing of ties is controlled by the angle and layout of each crossing, the preferred average being approximately 20 in. Regardless of the size of the timber, and other variations preferred by individual railroads, the crossing should be well supported under the critical points of impact and timber spaced as uniformly as possible for good tamping.

Cut Spikes Preferred

Cut spikes are preferred to fasten the crossing plate to the timber, although there is some use of screw spikes. Although some timber is bored for cut spikes, the general practice is not to prebore holes for cut spikes unless power tools are available. Preboring is considered essential for screw spikes. The use of a base plate of sufficient thickness under the crossing itself is considered highly desirable and economical, and has resulted in much saving in wear of critical parts and reduction in general maintenance.

Approximately 50 per cent of the reporting companies are using pads between the plate and the tie. The pads vary in thickness from ¼ in to ¾ in, are composed of combinations of different types of material. At this time their use is still considered as in the experimental stage. However, in the light of present knowledge and experience, the large majority, probably 90 per cent of those who reported the use of pads, express a rather strong opinion that definite economies are being realized by a reduction in wear of frogs and in general maintenance of crossings.

There was almost unanimous personal opinion expressed that the use of pads will also prolong the life of the timber and result in definite economy in maintaining line and surface. It is recommended that more railroads make test installations of pads of different types and makes as a service to the industry, in order that definite economies, if any, may be more definitely determined over a period of years.

Proper Anchorage Needs Study

It is unanimously agreed that more anchors are required, in all directions from the crossing, than are generally used as standard practice on line of road. Agreement ends at that point. There are almost as many different methods, and expressed opinions as to number of anchors used, pattern of application and distances extended from the crossing, as there were reporting railroads. This indicates

that proper anchoring of each crossing must be determined by careful study and experience.

In general, the distance for the expanded use of anchors varies from 100 to 1300 ft on either side of the crossing, the average being 100 to 400 ft. This distance depends upon approaching and leaving grade, intensity and direction of traffic, speed, whether single or double track, etc. The number of anchors used apparently depends entirely upon experience and varies from 10 to 12 to each rail to their use on every tie for a considerable distance from the crossing. The pattern seems to vary with the personal preference of the supervising official. Some prefer to box grip-type anchors on every tie and some do not. Some use more anchors forward than backward, several use compression clips on practically every tie for varying distances, and others definitely prefer grip-type anchors applied only against the direction of traffic. All agree that the use of sufficient anchors is necessary and attach great importance to this factor in the economical maintenance of crossings.

Important to Maintain Joints

The maintenance of joints within the crossing itself, as well as in the tracks adjacent to the crossing, is of utmost importance. While most railroads do not consider any special type of joint maintenance necessary, all agree that more frequent inspection is desirable and that more attention should be directed to keeping bolts tight and joints well supported and tamped.

Insulated joints of good design and high quality should be specified. There is general use of a canted abrasion plate on each tie under these joints. There are many designs of these plates, the average plate used being 8 in by 14 in. in size and ⅝ in to ¾ in. in thickness.

In general, where solid frogs or crossing angles of 90 to 45 deg are used or where step joints are necessary it is impossible to install insulated joints. In these cases it may be possible to install a trap circuit, to provide for proper protection, and install the insulated joints outside of the immediate crossing area. This type of circuit opens the signal-control circuit as the train approaches the crossing and does not permit it to be re-energized until the rear truck of the train has passed the crossing area. On small-angle crossings insulated joints may be placed close to the frogs and the circuit transposed to shorten the dead section in order to comply with ICC requirements.

Use of Flaw Detectors

There is general use of some type of ultrasonic testing device on both rail and manganese crossings. It is agreed that the results obtained on rail crossings, or rail portions of manganese crossings, are quite satisfactory. However, there is considerable doubt that such devices will always give a positive indication on manganese.

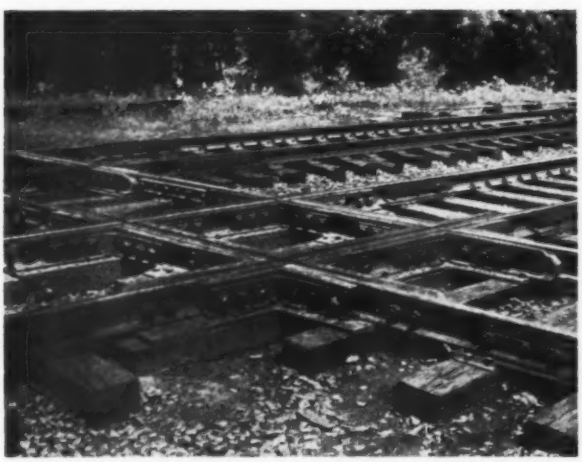
Small cracks in manganese are not as serious as those in open-hearth rail but a variety of opinion exists as to the extent they should be allowed to develop before repairs are made. Small cracks in the base of manganese crossings are not considered serious unless they are developing and traveling rather fast. Small cracks in the bottom of the flangeway, parallel to the point, are not considered serious, but, if these cracks are on the side wall of the points, repairs should not be too long delayed.

Supervisors and foremen, particularly the latter, should make frequent inspections of all crossings. Cracks discovered by the foreman should be reported to the supervisor immediately. The supervisor should exercise personal and responsible jurisdiction, and use good judgment as to the time and necessity for making repairs. The issuance of definite instructions in regard to such repairs is not considered desirable or necessary. The time when cracks should be repaired will depend upon location, size, rate of growth and their effect on the casting.

If practicable, it is desirable to surface, line and tighten bolts in the crossing before extensive welding is performed.

Grinding to Maintain Flangeways

It is agreed that it is necessary and advisable to remove the metal flow from flangeways before it has reached the point where chipping will occur or the flangeway has become too narrow. No definite rule has been developed as to when this should be performed. The necessity for corrective action should be de-



". . . MORE attention should be directed toward keeping bolts tight and joints well supported and tamped."

FRAMED hardwood timbering is sometimes used as an alternate to treated hardwood crossties as a crossing support.

"We need more grinding and less welding in crossing and frog maintenance."

termined by the supervisor and should be handled before welding becomes necessary. Power grinding is the approved method for removal. This work is usually performed by a division welding crew or qualified local forces.

It is desirable to maintain a manganese crossing as long as possible by grinding. The thought has been widely expressed that "we need more grinding and less welding in crossing and frog maintenance."

Good Line Prevents Wear

Crossings should be lined, when necessary, to prevent undue wear on the frogs and other parts and to insure the comfort of patrons and safe operation of trains. The speed of operation over the crossing has a direct relation to the accuracy of line that must be maintained. Poor alinement is generally corrected by conventional methods, such as cutting and/or driving certain rails after anchors are removed, adjusting the expansion and then lining with bars and jacks. Anchors are then replaced and it may also be necesary to rearrange the base plate and reset the welded stops.

With few exceptions, most railroads encounter difficulty in maintaining gage, particularly in open-hearth crossings with more working parts, and in crossings where the angle is under 45 deg. Gage is also affected by rail movement which drives one side more than the other. It is generally corrected by a combination of methods involving loosening up the crossing and retightening and renewing bolts, insertion of metal shims, renewing and/or welding on existing fillers and "stops," and, particularly in solid manganese, grinding to restore the proper flangeways. On crossings under 45 deg struts are often placed between the obtuse angles or gage plates may be installed. It is sometimes desirable and necessary to respace the ties and respike the crossings. It is desirable, economical and usually necessary to correct both line and gage at the same time, after which anchorage may be increased if this is considered necessary.

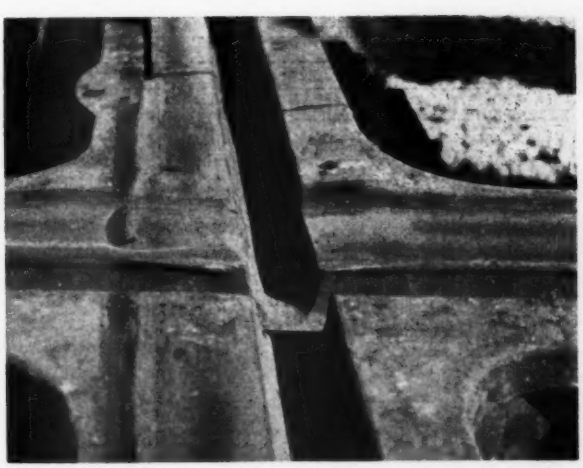
Inspection of Crossings

It was quite evident that frequent and detailed inspection of crossings is considered of utmost importance by all who are concerned with crossing maintenance. However, as may be expected, there are many variations in the frequency of inspection required and the extent of jurisdiction of supervising personnel. In general, the section foreman inspects crossings on his section almost daily and performs minor repairs and the supervisor makes a rather detailed inspection weekly, semi-monthly or even more often, and is responsible for ordinary repairs, such as line, surface, gage, welding and grinding, replacement of timber and ballast, etc. Semi-annually, quarterly and in some cases monthly, an inspection is made by the division engineer or comparable official, to determine if, and when, major repairs or replacements will be necessary. His recommendations are then referred to the district or chief engineer for final approval. On many railroads the program for inspection is even more frequent and detailed. This depends upon the location, density of traffic and the maximum speed over the individual crossing for each case.

There is unanimous agreement that crossings subjected to higher speeds require a higher standard of maintenance than those over which speeds are normal. Where higher speeds predominate, more refinement of line, surface and gage is necessary for comfort and safety, proper drainage becomes more important, more frequent welding is required, bolts must be kept tight at all times, and even the stability of the subgrade takes on greater importance. More frequent and detailed inspections should be made where high speed is normal and the type and design of the crossing to be used should be given careful study and consideration.

One engineer maintenance of way estimates that 50 per cent more maintenance is required on high-speed crossings. A division engineer states that, based on actual experience, rail-type crossings of approximately the same angle and traffic with normal speeds below 30 mph may be kept in service four times longer than those where speeds are seldom below 45 mph, and that under these same conditions of speed, maintenance costs are eight times greater for the crossings subjected to the higher speeds.

TIE PADS, such as these Bird pads, produce reported economies through reduction in general maintenance and frog wear.

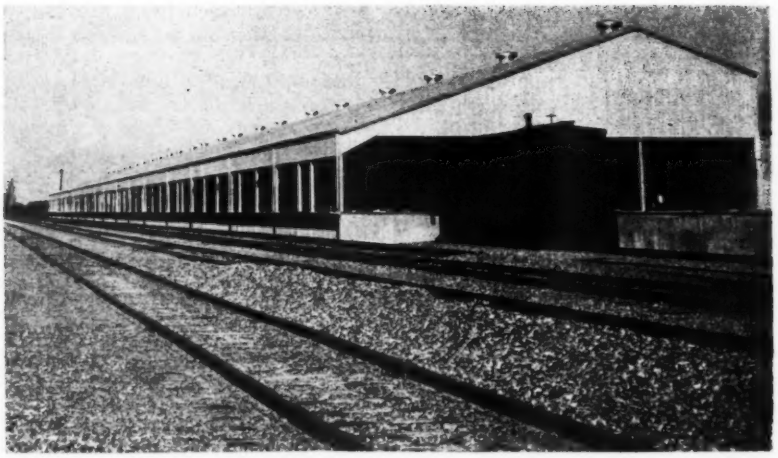


FLOWED METAL on points and in flangeways should be ground off before more serious chipping occurs.

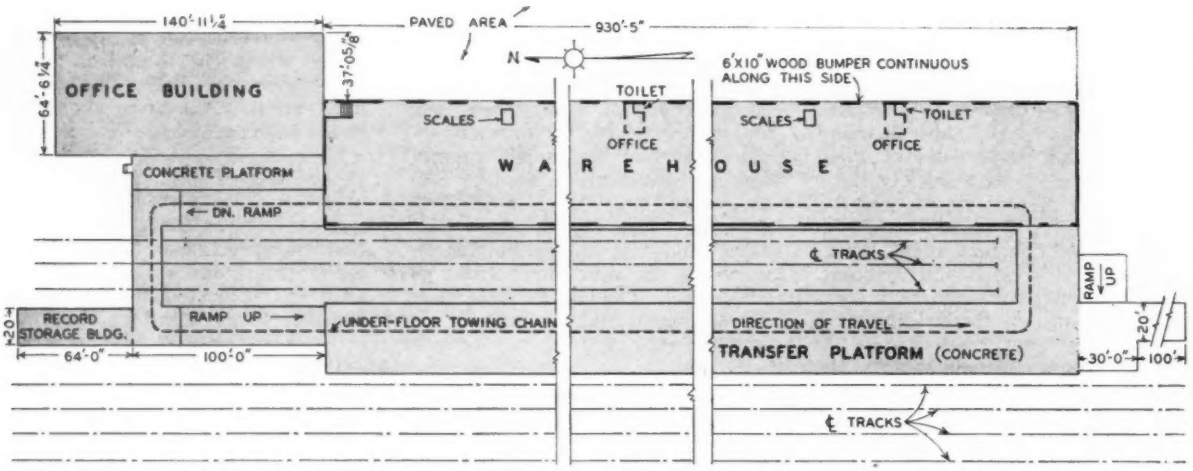
Freighthouse Shows Use of

Prefabs for Big Buildings

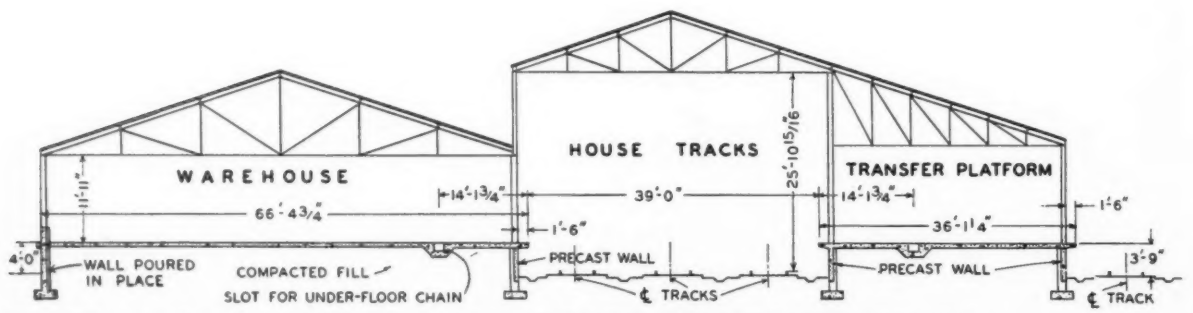
Possibilities of adapting prefabricated construction to large railroad structures is demonstrated by a new facility constructed near Nashville by the L&N and the NC&St.L. Built at a cost of only $1 million the structure is 1,030 ft long and 138 ft wide. Has interesting features.



TRACK SIDE of the new freighthouse, looking north and showing the transfer platform. There are four tracks on this side of the facility.



SHADED AREAS of this drawing show those portions of the new facility that are under roof. All buildings are prefabs.



THREE-BAY construction is indicated by this cross section. Note that three of the retaining walls were precast.

OFFICE BUILDING is at left and the record-storage building at the far right. In between is portion of main building that covers the north end of the under-floor towing circuit where it descends to the track level.

● On the outskirts of Nashville, Tenn., is a new railroad freighthouse consisting of one of the largest prefabricated structures yet built for railroad use. Aside from its size the structure has other interesting features, including an underfloor towing system for platform tracks, skylights of corrugated translucent plastic, precast concrete retaining walls, and the use of "aluminized" corrugated steel sheets for the roof and side walls.

The new freighthouse, which cost about $1 million, is a joint facility of the Louisville & Nashville and the Nashville, Chattanooga & St. Louis. It is located at Radnor yard, a large new gravity classification yard southeast of Nashville, which is also owned jointly by the two roads.

Before the new freighthouse was built, the loading and unloading of local lcl business for both roads, as well as transfer work, was handled in a joint freighthouse situated in downtown Nashville. This required a movement of 5½ miles between the new yard and the downtown facility. Construction of the new freighthouse at Radnor yard has eliminated this movement, thereby saving considerable time.

TAILBOARD SIDE of the freighthouse is flanked by a wide paved area. There are a total of 64 overhead rolling doors in this structure.

Includes Three House Tracks

The new freighthouse is an imposing structure. In overall dimensions, the freight-handling portion has a length of 1,030 ft and a width of 138 ft, all under roof. The facilities included in the building are a warehouse 64 ft wide, three stub-end house tracks, which enter the structure from the north end, and a transfer platform 34 ft wide. A cross platform at the south end connects the warehouse with the transfer platform. The layout also incorporates four additional tracks outside the structure on the same side as the transfer platform. Thus, there are seven tracks, three inside and four outside.

Aside from the main building there are two additional structures. One of these, a single-story office building, 64 ft by 141 ft, is situated at the north end of the warehouse. The other is a 20-ft by 64-ft storage room at the north end of the transfer platform. At the south end of the latter platform there is an outside concrete platform with a ramp leading down to ground level.

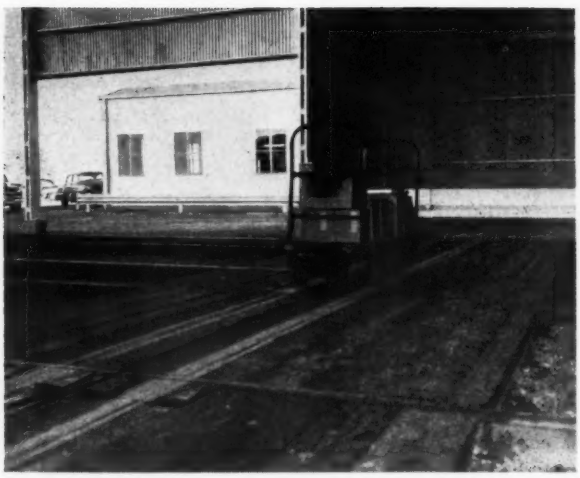
The underfloor towing system in the freighthouse operates in a closed circuit serving both the warehouse and the transfer platform. At the south end, the chain is laid in the floor of the cross platform, but at the north end it descends by means of ramps to cross at the track level. The circuit has a total length of 2,750 ft and the towing chain operates at a speed of 100 ft per min. There are two drive pits, one on the transfer platform and one in the warehouse, and there is also a slack takeup pit in the circuit at a 90-deg turn at the south end of the transfer platform.

The floors of the warehouse and the transfer platform consist of reinforced concrete slabs laid on compacted fill placed between concrete retaining walls on concrete footings. The construction is conventional except that all but one of the retaining walls are constructed of precast concrete wall sections, placed between concrete piers having integral lugs to take the outward thrust. The only poured-in-place retaining wall is that along the tailboard side of the warehouse.

Largest Armco Prefab

The superstructure of the main building is of prefabricated steel construction, with the roof and side

THREE TRACKS extend full length of building on inside. Platform truck is being towed by under-floor chain which . . .



. . . DESCENDS to the track level at the opposite, or north, end of the circuit. Speed of chain is 100 ft per min.

walls consisting of "aluminized" corrugated steel sheets fastened to the purlins and columns by clinch nails. The building actually consists of three bays or sections, one housing the warehouse, another covering the three house tracks, and the third, of leanto construction, covering the transfer platform. The roof-supporting structures are all of the truss type, and they all provide clear spans between the wall columns. All trusses are painted aluminum to match the aluminized sheets. The building was furnished and erected by Armco Drainage & Metal Products, Inc., and is said to be the largest prefabricated building to be constructed by that company.

The transfer platform is open on the sides but the warehouse is enclosed. The door openings in the side walls of this structure are fitted with overhead rolling doors made with aluminized steel slats. There are 64 doors of this type.

Plastic Skylights

Ample daylight illumination in the warehouse and on the transfer platform is provided by skylights of corrugated translucent plastic. Artificial illumination consists of fluorescent fixtures. Ventilation in the warehouse is furnished by twenty-one 36-in gravity ventilators.

The trusses for the main building were assembled on the ground at the site and raised with the aid of gin poles. All main connections are made with high-strength bolts.

About half the length of the warehouse (the northerly half) is given over to the handling of inbound merchandise, while outbound business is handled in the southerly half. Two small offices for the use of the warehouse foremen are provided along the east wall. The entire length of the warehouse on the tailboard side is flanked by a wide paved driveway for street vehicles, which extends around the south end of the structure to serve the open platform.

Underfloor Towing System

Merchandise requiring movement from one point to another in the facility is transported on four-wheel trucks attached at 15-ft intervals to the underfloor towing chain. They may be attached or detached as desired for movement between the tow chain and cars or street trucks. Other mechanical handling equipment includes two Yale & Towne fork-lift trucks and four Mercury tractors, all for handling bulky or awkward shipments.

The office building is an Armco Steelox prefabricated structure. Space provided here includes an office for the agent, a large general office, a counter and space for the cashier, a record room, a stationery room, rest room facilities for office personnel, a locker room for freight-house workers, a boiler room and an office for the depotmaster, from which there is a clear view of the warehouse through large window areas. The office building is fully air-conditioned and the exterior walls and ceilings are insulated with glass wool batt-type insulation. Interior walls and ceilings are of Steelox panels backed with sheetrock. Floors are of Johns-Manville vinyl-plastic tile. Walls are painted green, the ceiling white and the floors gray. All lights in the offices are fluorescent.

OFFICE BUILDING, also prefabricated, is fully air-conditioned. Walls and ceilings are of Steelox panels. Floors are of vinyl-plastic tile.

ILLUMINATION provided by skylights of corrugated translucent plastic is evident from this view taken in main warehouse. Tailboard side at right.

Fast communications as a means of promoting efficiency throughout the new facility were given careful attention in the design of the freighthouse. The nerve center of the several systems is located in the depotmaster's office. An intercommunication system between that office and the warehouse and transfer platform includes 12 telephones throughout the latter areas connected to a telephone in the depotmaster's office. This system incorporates in the latter office a regular dispatcher's amplifier by means of which men on the platforms can call the depotmaster to the telephone. When the depotmaster picks up his receiver, the amplifier is automatically cut out. This system includes 12 paging speakers in the warehouse end on the transfer platform by means of which the depotmaster can call warehouse personnel to the nearest telephone.

A separate communication system for checking car-loading and unloading operations also centers in the depotmaster's office. The purpose of this system is to permit car checkers in the office to communicate with freight handlers in cars and on the platforms. A switchboard in the depotmaster's office provides the means of establishing communication between seven checking booths in an adjacent room and 67 outlets, arranged singly or in pairs, in the warehouse and on the transfer platform. For plugging into these outlets the freight handlers use reels carrying 70 ft of cord.

In each of the car-checking booths in the office there is a console with five keys, so that theoretically each checker can work with five handlers. A console in the agent's office permits him to monitor the work of the checkers. Waybills are delivered to the new freighthouse by a pneumatic tube system originating in the main Radnor yard office, 1¾ miles away. This system consists of a 5½-in tube from the main yard office to the "bowl" office, and a 3-in tube from the latter point to the new freighthouse.

Operations at the old freighthouse in downtown Nashville were on a five-day basis. The new freighthouse will be in operation seven days a week. The receipt and delivery of freight will continue to be on a Monday-through-Friday basis. On Saturdays and Sundays the operations will be confined mostly to the handling of transfer business. This will make it possible to make local deliveries of freight on Monday morning instead of on Tuesday.

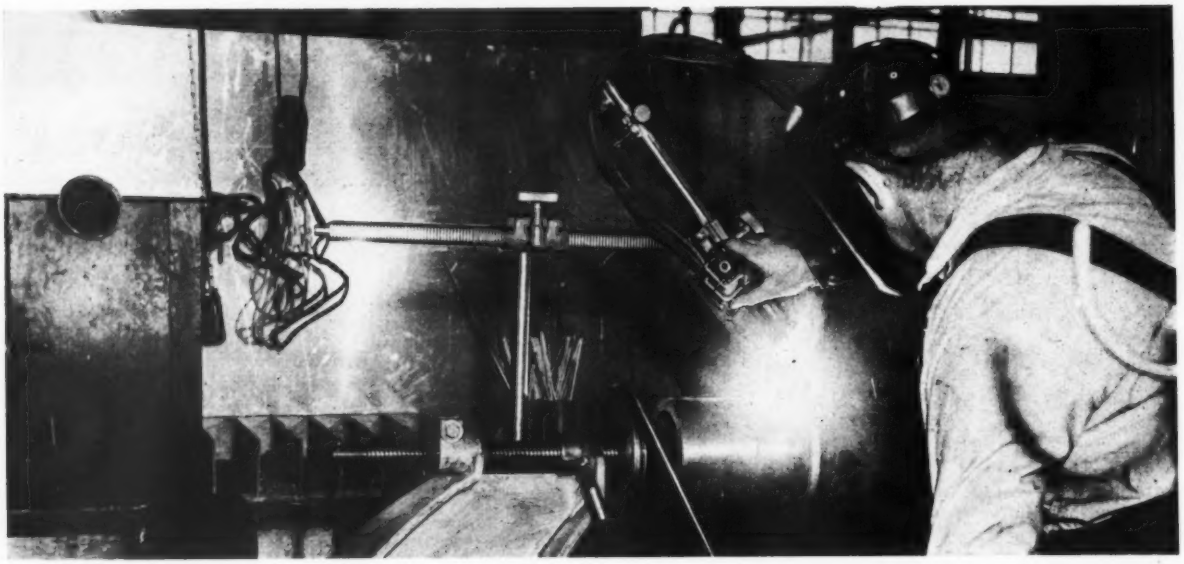
Cars loaded at the freighthouse generally will be sent over the hump, but those destined for evening trains will be switched directly to the departure yard.

The project for constructing the new freighthouse was carried out under the general supervision of L. L. Adams, chief engineer, Louisville & Nashville, H. C. Forman, assistant engineer, and A. E. Drabnick, engineer of buildings. The building itself was designed by Armco Drainage & Metal Products, Inc., working with the railroad's engineers. L. D. Thomas, resident engineer, and Paul Hadden, assistant resident engineer, were in charge of the work on the ground.

COMMUNICATION system for car checking centers in depotmaster's office.

CONSISTS of shipments are recorded by clerks in seven checker booths.

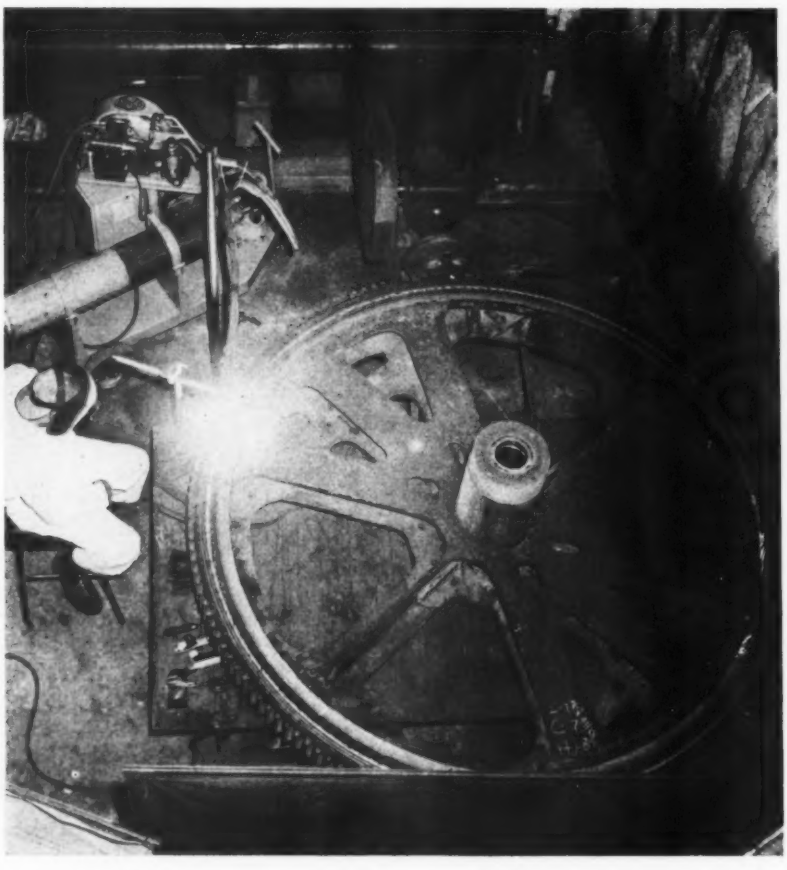
VERBAL RECORD of shipments is transmitted by units on reels (left).

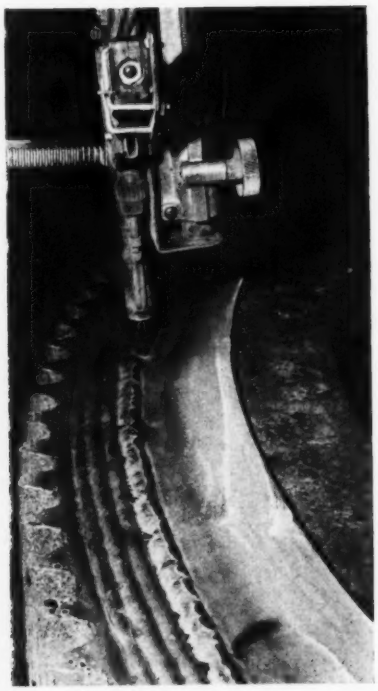


STUB AXLE from 2-yd shovel being built-up with Aircomatic welding gun. A No. 20 Radiagraph is used to rotate the axle while two passes are made to deposit weld metal. Total time required for job, including grinding, was 1 hr 20 min.

For Repair of M/W Equipment . . .

Special Welding Process Makes Debut





WELD METAL was deposited on swing gear in two passes, using total of 165 lb of welding wire.

SWING GEAR roller path required 45 hr for building-up and grinding. Ability to grind surface without removing gear from welding jig saved time.

AIRCOMATIC GUN deposited 1/16-in diameter railroad wire on the axle at rate of 125 in per min.

By H. V. Stewart and S. J. Welz*

● The Aircomatic process was used for the first time recently—and to good advantage—in repairing maintenance of way work equipment in the shop of a large West Coast road. Estimated savings of $700 were realized when the process was used in building up a roller path swing gear for a 2-cu yd shovel.

A prime factor in achieving this saving was the ability of the process to reduce sharply both welding and grinding time. Equally important, however, was the fact that all repairs could be effected in the M/W shop. Formerly, when similar repairs were made with stick electrodes, equipment had to be shipped 90 miles to a larger shop.

Another illustration of the cost-cutting effected by use of the Aircomatic process was furnished in the same shop by its use in building up stub axles on the same crawler shovel. What had heretofore been a time-consuming operation was reduced to where the entire work was completed in 1 hr 20 min.

In both repair jobs, the continuous deposition of filler metal at high rates of speed reduced welding time considerably, while use of the same jig for both welding and grinding eliminated shifting of equipment to a separate mount in order to complete grinding.

* Mr. Stewart and Mr. Welz are representatives of the Air Reduction Pacific Company, Emeryville, Calif.

What Is the Aircomatic Process?

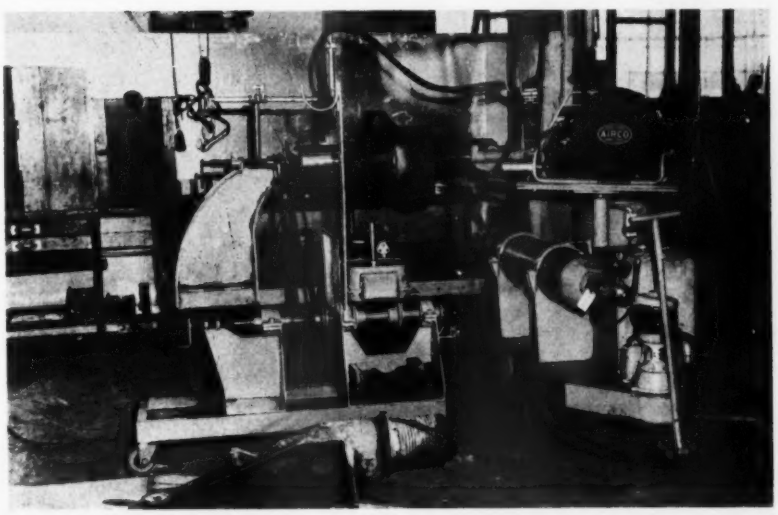
The Aircomatic process may be defined as inert-gas-shielded metal-arc welding.

The electrode is a bare wire which is fed continuously into the weld pool by a power-driven mechanism from a spool or coil. An envelope of inert gas—helium, argon or a mixture of both—flows out of the nozzle of the welding gun through which the wire passes. The gas surrounds the arc, excluding air and preventing weld-metal contamination.

No flux is said to be required for atmospheric protection and the removal of impurities. Since there is no slag coating on the weld metal, it is possible for the operator to see what he is doing and the need for cleaning and chipping is eliminated.

The transfer of the electrode material through the protected arc column is said to increase the efficiency of heat input to the work piece. This increase in efficiency is partially the result of the heat content of the superheated metal passing through the arc. It is pointed out that the resultant high intensity heat source permits rapid welding.

Equipment used in the process includes, in addition to the welding gun, a wire reel, a feed motor, electrical controls, flexible hoses and a tank of inert gas.

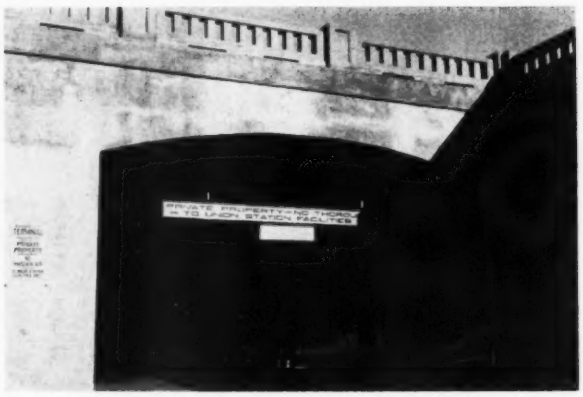


WELDING EQUIPMENT is all contained on the cart at right, making it easily portable to any location in the shop area.

MECHANISM for rotating swing gear at constant speed during welding consists of the rear axle section of a truck attached to a motor.

SPALLED and broken concrete is removed and the repair area sand blasted. Reinforcing is 8-in by 8-in wire mesh.

NEW CONCRETE is placed over the wire reinforcing mesh in successive layers by workman operating the nozzle of the concrete gun. Density of concrete is controlled at nozzle.



FINISHED and smooth surface of the air placed concrete was obtained by means of hand troweling.

Shotcrete Repairs For Busy Underpass

● Air placement of concrete proved to be the solution to a concrete repair problem recently encountered by the Kansas City Terminal, Kansas City, Mo. Rain, water seepage and heavy traffic had taken their toll on the underpass beneath the Union Station Plaza at Kansas City, which is owned by the terminal company. The arches at the two entrances to the tunnel had become badly spalled and cracked and were in need of repairs.

A complicating factor was the need of minimizing interference with the passage of Railway Express trucks moving to and from the express loading dock. This meant that the building of concrete forms in making the repairs would present difficulties. Use of the company's Bondactor concrete gun seemed to be the logical answer to the problem. This would eliminate the need for forms and permit the concrete to be placed from movable scaffolding.

The first step was to remove all of the loose, spalled and broken concrete. To be sure the surfaces were as clean as possible and to obtain a tighter bond between the old concrete and the new, the Bondactor, coupled to a 210-cfm compressor, was used to sandblast the repair areas. Next, 8-in by 8-in highway wire mesh was placed over the cleaned areas as reinforcement. The surfaces were then ready to receive the concrete.

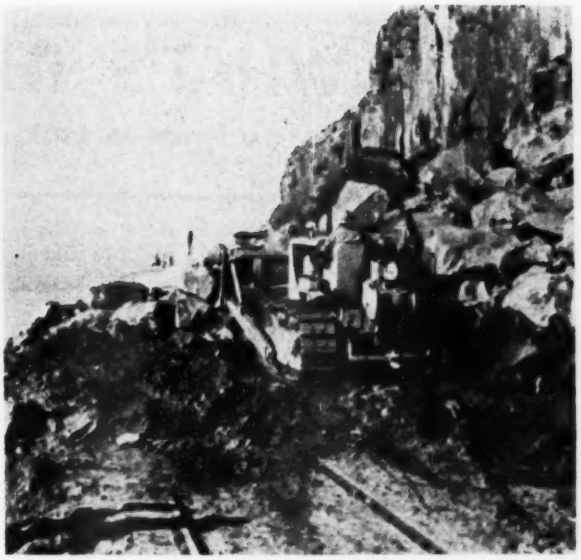
In operating the concrete gun two men were stationed on the ground (one to load dry sand and cement into the hopper and the other to operate the controls). A third man, operating the nozzle of the gun, was stationed on movable scaffolding. This man, through manipulation of valves on the nozzle, was able to regulate the density of the concrete being applied.

The concrete was applied over the wire mesh reinforcing in successive layers until the desired thickness was obtained. The surface of the new concrete was hand finished with a trowel.

Officers of the road stated that this is just one of many such restoration jobs on which their concrete gun, manufactured by the Air Placement Equipment Company, has been used.

TRAFFIC OUTLOOK—Freight traffic in 1956 will do at least as well as in 1955, when car loadings were up more than 11 per cent, and the ton-miles were up almost 13 per cent over 1954, says the Association of American Railroads. Of particular importance will be the remarkable comeback being shown by coal, a prime source of railroad revenue. A truer measure of 1955's traffic is 1953—a period of more comparable economic activity. On this basis, the 1955 traffic was up only 2 per cent and carloadings actually decreased 1 per cent. What a 7 per cent rate increase would do to traffic depends on whether trucks would raise their rates and whether a shortage of trucks and barges develops.

About Slides . . .



MAN-MADE: A new 14-mile route, which in general follows the existing line, is being built for the Spokane, Portland & Seattle at The Dalles, Ore., by the Morrison-Knudsen Company. The route will place the track above the proposed pool level of The Dalles Dam now being constructed across the Columbia river. The new line will average 16 ft above the present river-level railroad. Excavation consists almost entirely of solid basalt, a dark gray to black dense rock, through one long rock cut after another. Blasting is necessarily a continuous operation and frequently causes rock slides to fall on the existing track at the lower level. A Caterpillar D8 Tractor and a Northwest shovel are stationed below the blasting and excavation operations to keep the track clear of rock and debris.

News Briefs in Pictures . . .

NATURE-MADE: Heavy torrential rains and melting snows in Oregon, Northern California and Nevada, combined during the Christmas holidays to cause washouts, landslides and floods which blocked all the major routes into San Francisco, Cal. An exception was the Santa Fe's line through the San Joaquin Valley, over which much of the disrupted traffic was re-routed. Here are views of a slide which occurred on the Northwestern Pacific's main line along the Eel river, 28 miles south of Eureka, Cal., where the water rose seven to eight feet above the tracks. Other roads were also severely damaged by the floods.

WHAT'S THE ANSWER? . . .

. . . a forum on track, bridge, building and water service problems

Building Up Engine Burns

What precautions should be taken when building up engine burns by welding? What are the limitations, if any, of this method? Why? Explain.

Proper Preparation Important

By KURT KANNOWSKI

Metallurgical Engineer, Engineering Division, AAR, Chicago

The welding methods and rods in use for repairing engine burns on the various railroads have shown wonderful performance. Only 10 failures of welded engine burns, out of better than 300,000 welded engine burns made, came to my attention in 1954. In each case of failed engine burns, the failure was due to a lack of preparation of the engine burn prior to welding.

Extreme precautions must be taken in removing all burned metal and thermal cracks prior to welding. This is difficult at times, if an oxyacetylene torch is used, because some of the cracks can be covered by the melted metal. If grinding is resorted to when preparing the engine burn care must be taken to avoid production of grinding cracks and burnt metal. Small inclusions of over-oxidized metal and cracks in the parent metal have been the only causes of failed welded engine burns reported to date.

There are no technical limitations. However, no known practical method of testing welded engine burns has been developed.

Lists Nine Precautions

By D. J. BELL

Welding Inspector, St. Louis-San Francisco, Springfield, Mo.

There are several precautions that should be observed before and during the process of building up wheel burns, especially when this is done in track under traffic:

(1) An A-1 line-up should be secured.

(2) The weld should not be started if it cannot be carried to completion and allowed to cool before allowing traffic to pass over it.

(3) A competent welder should be used. That is, a man that has been instructed in the proper procedure used on that particular railroad and one that can be relied on to produce a 100 per cent job on every wheel burn.

(4) The rail should be in proper surface at the burn.

(5) All defective metal should be removed by grinding prior to the welding.

(6) Welding rod of the proper type should be used.

(7) The weld should be started at the point nearest the operator and welded toward the farther point, making patches not over two inches in length, and hammering each patch on completion.

(8) After the weld is complete, the base and web of the rail should be heated in such a manner as to offset the shrink that will occur in the ball of the rail. If this is not done in the proper manner the rail will kink downward when cool.

(9) After the weld has cooled it should be ground to a true straight-edge surface.

As far as limitation of building up wheel burns are concerned, it would be my opinion that this depends on whether rail is available to change out the burned rail. I see no limit to the depth or length of wheel-burn welds so long as the proper procedures are followed and the work can be done at a saving.

Remove All Defective Metal

By R. W. TORBERT

Manager, Maintenance of Way & Construction Department, Linde Air Products Company, New York

The repairing of driver burns by welding had progressed slowly until recent years, but has accelerated rapidly as the cost of rail and labor have increased. Many hundreds of thousands of burns have been suc-

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered in the May Issue

1. There are frequent branch-line locations where the ties are not fully tie plated. During out-of-face tie-renewal operations, to what extent should unplated ties, not removed and replaced, be plated? If all ties are plated, what is the best method to use?

2. Should records be kept of the repairs made to individual buildings? In what detail? Who should be responsible for them? How can they be used?

3. What is the best method of surfacing track through a highway grade crossing where it is not possible to raise the track grade? Explain.

4. Under what circumstances are pipe drains required in the backfill adjacent to the sidewalls of masonry culverts? How may they best be installed? Explain.

5. When new rail is to be surfaced immediately after it has been installed, should the anti-creepers be installed by the rail gang or the surfacing gang? Why?

6. What is the minimum width required for pipe-line trenches? Most economical width? What effect does the diameter of the pipe or the depth of the trench have on this width? Explain.

cessfully repaired with relatively few failures. By following simple procedures, repairs are quite as acceptable as the building up of rail ends.

The most important phase is removal of defective metal under the burns. This may be accomplished either by grinding or by gouging with the oxyacetylene torch. Careful attention must be paid to the removal of all hairline cracks underlying the burn. After this is complete, the rail is preheated to about 500 deg F. Weld metal is applied with the oxyacetylene torch. A special rod is available which, when applied, develops the same hardness as rail steel. This lower hardness in repairing burns is desirable as it eliminates the possibility of secondary batter. After the welded area has cooled to a black heat, the weld is reheated to a normalizing temperature to recrystallize the weld metal. No further heat is required unless it is necessary to counteract any dipping produced in the rail by the weld application. Final finish is accomplished by grinding.

The number of driver burns per rail which justify repair can readily be determined by the economics involved. These include the value of the rail being repaired (the service life to be expected after repair as a numerator divided by total service life times the difference in cost between the new and scrap value of the rail). This value should be added to the labor and delivery costs of changing out the rail. The resulting total, divided by the cost of repairing a burn, will give the economical total number of driver burns. The recent trend of steel prices and labor would indicate that this total is constantly increasing.

A Very "Touchy" Subject

By C. L. Waterbury

Assistant Engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago

The Milwaukee Road does no welding of wheel burns unless they are protected with joint bars. We use a stainless-steel electrode and arc-weld wheel burns on rail sections of 90 lb and heavier after joint bars with two bolts are applied. Such welds are easily recognized on sight by anyone, at any time, even after many years.

We have seen many gas welds that have nearly vanished as far as appearance is concerned. Tension is always present in the ball of the rail after cooling of engine-burn welds, whether made by arc or by gas welding.

The rules covering such work on some other railroads read as follows: "Only three welds will be permitted in one rail." Yet some of us know that it is often impossible to see or find welds several years after they are made. In such cases a welder might again put down two or three more welds in the same rail.

One railroad permits no wheel-burn welds on any rail section lighter than 100 lb. It might be better to limit the length of a burn to be welded for each rail section. A burn only 2 in long in a 9020 rail could be welded better than a 6-in burn on a 112 lb section. If the web and base were properly preheated, any section could be welded with good economy.

Rules pertaining to welding of wheel burns should be carefully worded by men who are thoroughly familiar with all of the details and inherent hazards of the process, and with the importance of being able to recognize weld locations throughout the life of the rail.

This is a very "touchy" subject, but a most interesting one. It is one in which there is great economy as we approach a cost of $100 per 39-ft rail length in track.

Removing Deposits from Diesel Fumes

What can be done to prevent the formation of deposits on the undersides of shop roofs due to exhaust fumes from diesel engines? What is the best method of removing such exhaust fume deposits? Explain

No Easy Method

By Division Engineer

Deposits on the undersides of roofs in shops and enginehouses result from the fumes which emanate from the exhausts of diesel engines while they are idling in these buildings. The amount of these deposits is proportional to the unburned fuel in these exhausts. This in turn depends on two factors—the quality of the fuel being burned and the adjustment of the engine. Generally speaking the greatest concentration of these unburned materials occurs in the exhausts of engines that are cold or are idling.

The primary reason that this equipment is being run in the shop is to permit the making of adjustments made necessary because of faulty over-the-road operation.

The perfect solution of this problem would be provision of shop ventilation which would discharge these fumes directly outside the shop as they come from the engine exhaust. However, arrangements to handle fumes in this way are seldom found except in the more modern diesel shops where ventilation of the shop was provided for in the design of the structure. There are a substantial number of diesel shops which have been set up in existing or remodeled locomotive enginehouses where modern ventilating equipment cannot be economically installed. In such buildings the deposits from diesel fumes build up on the underside of roofs and must be removed periodically to reduce the fire hazard.

We know of no method with the exception of steam cleaning which will effectively remove these deposits. This method is messy, but effective. For the most economical application, either permanent scaffold supports should be supplied to permit ready access to the undersurface of the roof or ceiling of the shop, or use should be made of one of a number of truck-mounted aerial platforms which are now on the market. It will, of course, generally be necessary to close off that section of the shop being cleaned from the remainder of the shop area during cleaning operations. This will localize the range of falling debris and permit the remainder of the facility to operate.

It was reported at the last meeting of the Bridge & Building Association, in Chicago last September, that one road was using lightweight aluminum sheets to coat the ceiling area and that it was easier to remove the fume deposits from this material than from the normal ceiling surface. We have had no experience with this method.

Minimum On-Track Time for Tie Gangs

What is the minimum daily on-track working time which will justify the use of a highly mechanized tie-renewal gang? What factors affect this minimum? Why? Explain.

Based on Production

By R. H. Beeder

Assistant Chief Engineer, Atchison, Topeka & Santa Fe, Chicago

Mechanized tie-renewal gangs on the Santa Fe are made up with an organization of about thirty-eight men, including foreman, timekeeper, machine operators and laborers. They are equipped with five major items in the way of machines and four smaller machines or a total of nine machines for handling their work. The total investment in machines is about $35,000.

With this investment in machines and manpower we feel that the minimum daily on-track working time should be from 3½ to 4 hr. In actual practice the on-track working time exceeds this considerably and often will average six hours or more per day. Even on a heavy-traffic, high-speed main line this high daily on-track working time is obtained principally for two reasons, as follows:

(1) All machines are equipped with pneumatic rubber-tired, retractable set-off wheels. These set-off wheels can be swung down and locked in position with spring-loaded plungers which usually make the removal of a machine from the track a matter of seconds.

(2) General use of a "Speed Limit Order" to trains which designates the location of the gang to the engineman, with instructions to be prepared to stop unless proper proceed signal is received. The signal to proceed at restricted speed is given with a yellow flag or a yellow light. The use of this order permits the gang to work up until the last few minutes before train arrival and practically eliminates clearing and waiting for overdue trains.

The minimum daily on-track working time is based largely on the production of our mechanized tie gangs.

We are able to renew from 90 to 100 ties in each hour of working time and well over 300 ties can be renewed in the 3½ to 4 hr selected as the minimum. Our rate of production per hour produces tie-renewal costs varying from $0.85 to $1.10 per tie for supervision and labor.

Under average conditions the factor that governs the economies and justification for a mechanized tie-renewal gang is not the daily on-track working time but the number of ties to be renewed per mile. The daily on-track working time is almost always sufficient for economy but we found that we must have about 250 tie renewals per mile to justify a highly mechanized tie renewal gang. If tie renewals are more scattered than this figure we have found that the gang has to spend too much time in travelling from tie to tie to keep their daily production up to a high enough figure to produce economical unit costs.

Continuous Rail on Open-Deck Bridges

What special precautions, if any, should be taken when laying continuous-welded rail over long open-deck bridges? Why? Are there any restrictions governing the use of long rail on such bridges? Explain.

A Question of Proper Anchorage

By R. H. Beeder

Assistant Chief Engineer, Atchison, Topeka & Santa Fe, Chicago

Little actual experience has been obtained to date in laying continuous-welded rail over long open-deck bridges on the Santa Fe as our high-speed, heavy-traffic main lines are almost entirely bridged with ballasted-deck structures. Of course, this problem resolves itself almost entirely into a question of proper anchorage. We have laid welded rail in 1440-ft strings across open-deck bridges that are 30 ft long without anchorage on the bridge.

In making advance plans for the day when we will certainly lay continuous-welded rail across long open-deck bridges, we feel that 3-span bridges, or bridges about 42 ft long, can be safely crossed without anchorage on the bridge. For longer bridges we plan to install additional fastening devices to hold the ties in proper position and box-anchor every bridge tie that is firmly positioned.

Our present standard construction for open-deck timber-trestle bridges involves fastening all bridge ties to the 4-in by 8-in guard timber on each tie end with a ¾-in by 10-in double-grip drive spike. In addition, four bridge ties in each 14-ft span are bolted to the outside stringer of each chord with ¾-in bolts. We also tie the outside stringer of each chord to the cap with ½-in by 6-in by 8-in angles that are 4 in long with holes to accommodate ¾-in by 6-in single-grip drive spikes.

When laying continuous-welded rail over long open-deck bridges of this type we will install sufficient additional ¾-in by 26-in bolts to fasten an adequate number of additional bridge ties to the stringers to permit additional rail anchorage. In our type of construction the additional bolts per 14-ft span can reach a total of four giving us a maximum of eight firmly bolted bridge ties per span. Creosoted wood blocking, sized 3 in by 10 in by 1 ft long, should also be fastened to the tops of caps outside of both chords to resist lateral forces. In some of the older open-deck bridges it may also be necessary to place additional angle-iron brackets to tie the stringers to the caps.

On long bridges of open-deck T-rail and steel construction we have had to anchor our jointed track by applying a sufficient number of one of the standard forms of rail anchors. When required we welded angle-iron lugs on the steel members of the open-deck bridge to hold the bridge ties in position to permit the rail anchor to act against the tie in overcoming the creeping of rails on the bridge.

One extremely important fact that is pointed out under recommendations in the AREA Manual is that adequate anchorage of rails on the adjacent roadbeds must not be overlooked. There should be no accumulated rail creepage coming to an open-deck bridge from the approaches due to inadequate anchorage on the adjacent roadbeds.

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This live interest is typical of progress being made in convincing railroads by small test work that brush killing must now supplement weed killing work, using chemical. Cost per mile compared with hand work is impressive. Equally convincing is inspection made in the second growing season. Let us show you the large dollar savings made possible when brush control work is entrusted to our experienced organization.

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Absorption of Section Gangs

The reorganization of track-maintenance forces on some railroads has reduced section gangs to skeleton organizations or absorbed them completely in larger gangs. What has been gained from the standpoint of economy and efficiency in the prosecution of maintenance work? What has been lost? Why? Explain.

Larger Gangs Reduce Unit Costs

By W. E. Chapman

Superintendent Maintenance, Central of Georgia, Savannah, Ga.

The increased efficiency of the larger, mechanized gangs, reduces the unit cost of practically every job so materially that the economy of such gangs is readily apparent.

Before there can be economy, there must be a reduction in the unit cost of work performed. The larger mechanized gangs unquestionably reduce the unit cost of timbering and surfacing of track and of laying rail to a greater extent than a casual look would indicate.

The greater efficiency and economy of larger mechanized gangs and the better grade of track produced permits the introduction of smaller flexible gangs which replace section gangs. These smaller gangs take care of the smaller details of maintenance without a great loss of time and money while travelling to and from the work to be done. These mobile, flexible units can be and are camped at or near the site of work to be done. Generally, the men just have to walk out of their trailer living cars to be at their work.

The greatest savings, of course, comes from the reduced labor cost. When the cost of Railroad Retirement, vacation, hospitalization and other items are added to the labor rate the cost per hour is greater than the bare labor rate indicates.

Too, a better class of work is produced. This leads to other economies in the cost of timber and rail. Generally, when it is definitely known for what period of time track is to be prepared, the number of tie replacements can be adjusted to fit that time. This results in a considerable saving in timber and also in rail. Then too, there is more uniformity in timber condition on individual districts. This makes for better track conditions.

The only disadvantage that can be foreseen, and its importance has been reduced and probably eliminated by reduction in passenger service, is the riding condition of the track. With small flexible gangs keeping traveling time at a minimum, some smoothing, that would normally be done by section gangs in short order, will have to be postponed until the gang is in that vicinity, providing such delay does not endanger traffic. The matter of smoothing or spotting can be dispatched or handled by the supervisor according to need, and the flexible gangs can, accordingly, be moved over the weekends. There are few, if any, spots that get so rough in less than a week that they will have to be caught up at once, or in less than one week from the time they show up.

Many districts are without passenger service, and since freight speeds are generally less than passenger speeds, the quality of maintenance can be reduced to conform with the authorized speeds.

All this leads in but one direction and that is efficiency and economy in maintenance work.

Old Section Gangs Antiquated

By E. L. Anderson

Chief Engineer, St. Louis-San Francisco, Springfield, Mo.

The problem of reduction in number or size of section gangs, has been uppermost in the minds of track supervisors or roadmasters for several years. In fact, it is my opinion that today, generally speaking, section gangs as they were organized and used 15 years ago, are just as antiquated as is the use of a hand car for transporting track men.

How this change can be, or has been, brought about to accomplish economy and efficiency in maintenance-of-way work depends a great deal on the physical and organizational setups on individual railroads. Conditions that have pushed this problem to the front are: Greater permanency of the track structure; the intensive drive to get greater utilization of work hours paid for; more efficient production per man-hour; and a shortage of capable foremen.

The economy and efficiency in such reorganization has resulted in a reduced percentage of supervisory cost per work-hour, a lessened amount of time spent traveling to and from the job and greater production per man hour worked. This has partly been accomplished through the greater use of efficient machines for many of the processes where reorganization consisted of eliminating sections and replacing them with larger and fewer highly mechanized gangs. Another feature that has added to the economy and efficiency of track forces, since the elimination of sections and their replacement by larger and wider spread gangs, is the elimination of some of the valet services performed by track men. This has reference to menial and unnecessary tasks performed for other employees that at one time were required of track men when forces were readily available.

Track forces on our line were reorganized a number of years ago by eliminating many sections and installing fewer and larger gangs. This move added a great deal to both the efficiency of their operation and to the economy of maintenance of way. This program was assisted by supplying many additional units of maintenance-of-way work equipment and by a program of preventive or cycle maintenance rather than corrective maintenance.

We are now contemplating a further reorganization that will more effectively carry out our programs by use of highly mechanized gangs somewhat fewer and larger than at present used. These gangs will be complemented by patrol or "rabbit" units.

The above is a short resumé of what has been accomplished in economy and efficiency of maintenance-of-way work. Considering the situation from the standpoint of economy and efficiency, I can conceive of nothing lost by such action.

More Flexible Track Force

By L. L. Adams

Chief Engineer, Louisville & Nashville, Louisville, Ky.

Since the introduction of the motor car some 40 years ago, there has been a gradual lengthening of the

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BULLDOG anchor best for welded rail

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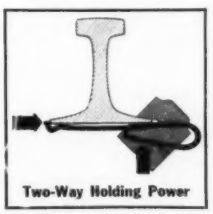
The 25% holding power increase results from new lugs forged into the anchor body. They put the anchor spring under compression as well as tension, producing a powerful two-way grip on the rail.

This track will STAY well-anchored because True Temper anchors retain their holding power through years of pounding service. Reasons: The initial application does not "take too much out of the anchor"; the broad, flat tie-bearing surface prevents tie-cutting and anchor-loosening. (Also saving money on ties.)



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track sections on our railroad, as well as those of other railroads. This more rapid means of transportation enabled us to lengthen main single-track sections to about 12 miles and branch-line sections to about 20 miles. Financial conditions are an important factor in governing the number of men assigned to a section gang and occasionally, due to limited forces, it was necessary to combine two or three gangs to perform the work at hand. Under these conditions more foremen were available than needed, and due to extended motor-car travel the section men had less time left for productive work.

In recent years many paved highways have been constructed in close proximity to our tracks with connecting roads crossing our tracks. Consequently, in 1949 we gave consideration to the forming of what we call district gangs, and equipped these gangs with a truck for transporting men on the highway and with a trailer to carry a motor car so as to permit its use with the minimum of rail travel. The personnel of each of these gangs consists of a foreman, an assistant foreman, and from 8 to 12 men.

Their assigned territory generally covers about 40 miles and headquarters are established at a central location. No living quarters are furnished these men.

We also have small section gangs consisting of a foreman and 3 or 4 men with extremely long territories. These small gangs do patrol work, inspect and adjust frogs and switches, unload materials and do other light work. They also work with the district gang when it is on their territory. At some isolated points we have kept the regular section gangs. This arrangement has worked very satisfactorily and has permitted us to reduce the number of foremen, to have gangs of proper size for "out-of-face" work, and to dispose of many motor cars, camp cars, tool houses and section houses as they are vacated. By using trucks in lieu of motor cars to transport the men to and from their work we have also reduced to a minimum the time lost waiting on trains.

Our practice of establishing district truck gangs and section gangs has been extended over practically the whole system. In fact it will be system-wide within the next few months, and has resulted in a 30 per cent reduction in the number of track gangs. We keep a sufficient number of extra gangs in camp cars on each division (about the same personnel as district truck gangs) to take care of emergencies and also do rail laying and other track work.

We believe the track reorganization outlined herein gives us a more economical and flexible track maintenance force than we formerly had and better supervision of the work, since additional assistant track supervisors have been added on all divisions.

Inspection of Deep-Well Pumps

How often should a deep-well pump be inspected? How should this inspection be made? If repairs are necessary, how can such a pump best be pulled? What special equipment, if any, is required? Explain.

Reduce Downtime to Minimum

By L. P. Drew

Assistant Chief Engineer, Union Pacific, Omaha, Nebr.

The decision as to how often deep-well pumps should be inspected must be governed by:

(1) The importance of the station.
(2) The type of pump in use.
(3) The kind of water being pumped.
(4) The amount of storage available.

At important stations someone should visit the pump at least daily. At less important stations where conditions are more favorable, weekly inspection may be sufficient. In no case should any pump be allowed to run continuously, even with full automatic controls, for more than thirty days without some inspection.

All of the inspections, whether daily, weekly or monthly, should be made by someone familiar with the station and the pump as well as other circumstances connected with the operation so that he can detect any signs which may later result in a breakdown or failure.

When conditions found indicate some defect or condition which should be remedied, a full crew of water service men should immediately be dispatched and the pump pulled from the well, completely disassembled and thoroughly inspected. If possible, repairs should be made immediately and the pump reassembled and installed in the well so as to reduce shutdown period to a minimum.

It is usually desirable, as well as economical, to provide a pulling tower as a permanent installation over the well. This equipment will serve for the original installation as well as for future maintenance. It will eliminate the necessity of moving special equipment to the site when it becomes necessary to remove the pump.

All special equipment such as cable, sheaves, clamps and special tools for the particular pump should be left in the pumphouse so that any gang available will have them for use.

If a power winch or special hoisting device is required, this will usually be available either with the gang or at some nearby terminal and this expensive equipment need not be tied up at any one location.

The reduction in downtime at important water stations will usually more than justify the expense of the special equipment required.

Five Symptoms of Trouble

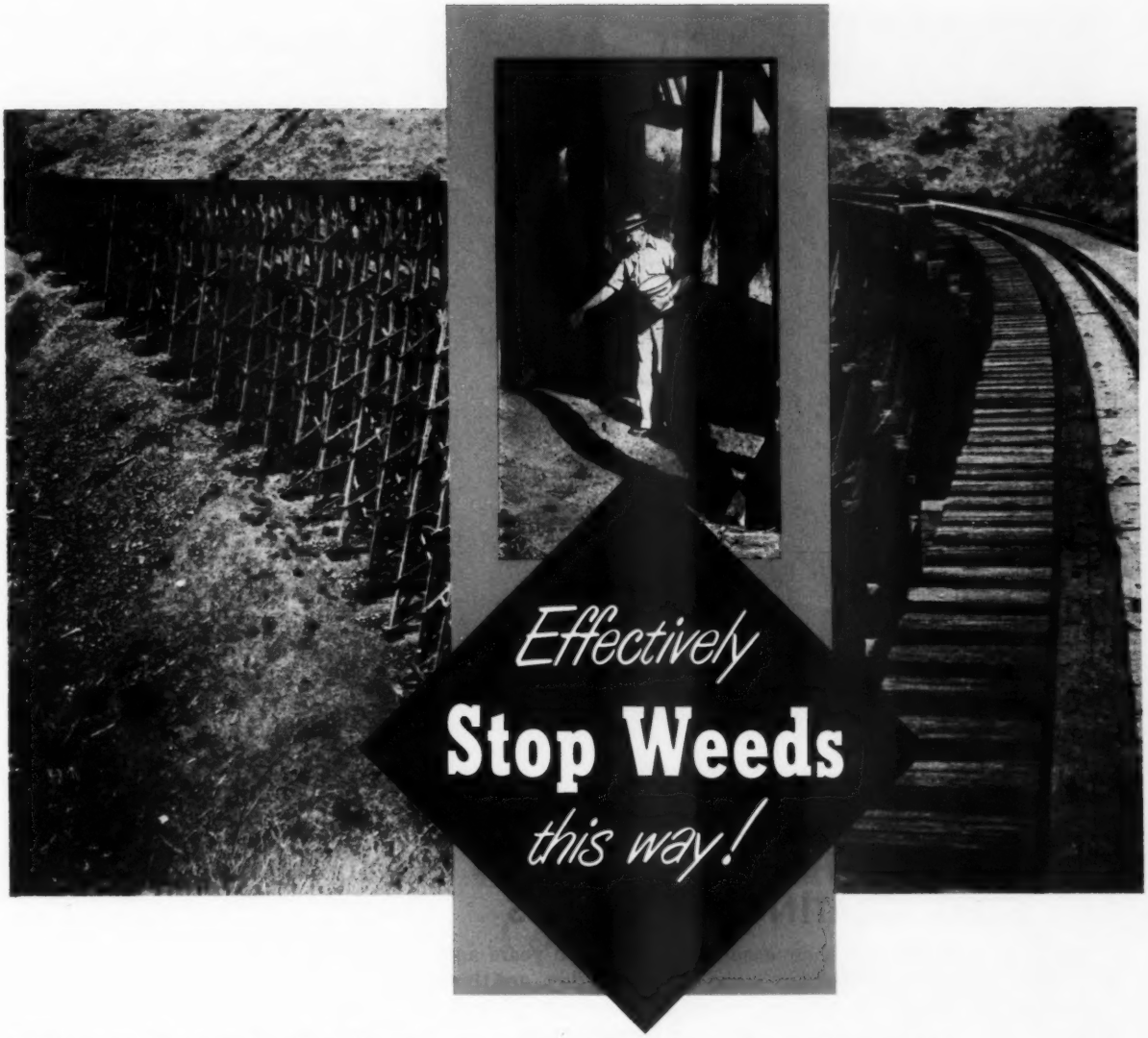
By E. R. Schlaf

Assistant Superintendent Water Service, Illinois Central, Chicago

There are many types of deep-well pumps in use on railroads today, but since the greatest volume of water is produced by the vertical centrifugal pump, this discussion will be limited to this type.

The best way to inspect a vertical centrifugal pump, often referred to as a turbine pump, is to check it for motor temperature, vibration, oil-tube feed and water leakage, production, and appearance of sand at the effluent. Frequency of inspection will depend upon the importance of the installation and its peculiarities.

Excessive motor temperature may indicate low voltage, high voltage, or excessive load. Proper size overloads in the starter will



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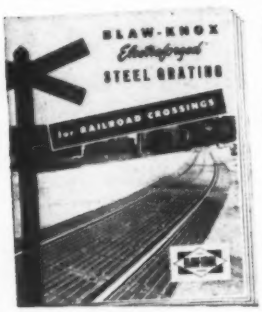

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help prevent burn out of the motor. If the motor is running hot, a voltmeter and ammeter should be applied and, if the amperage is 10 per cent above the nameplate rating, the overloads should be checked for defects or improper size.

Vibration may result from worn motor bearings, worn line-shaft bearings, or improper setting of the pump. Excessive vibration will result in excessive current consumption and premature failure of the unit. An often-used test for vibration is to balance a nickel on edge on a horizontal machined surface while the pump is operating.

Leakage, if it occurs in an oil-lubricated pump-shaft tube, indicates a break or leak in the oil tube or a worn seal at the bowl assembly discharge. If not corrected, premature failure of the line shaft and bushings will result, as the automatic oiler cannot function properly.

Turbine pumps do not positively displace water; their capacity varies with suction and discharge-head conditions. A production test should always include a determination of the pumping level and the pressure at the pump discharge.

The device most widely used to determine the pumping level is a small diameter air line, ¼ in or larger, of known length. This is lowered into the well alongside the column pipe. It is terminated at its upper end by a tee, onto which is attached a pneumatic tire valve and a pressure or altitude gage. A convenient length of tube to use is one that rests on the bowl assembly. If this is done, the bottom end of the air line should be cut diagonally. Air is pumped into the line until no further pressure can be obtained. The length in feet of the air line, submerged in water, is then read directly from an altitude gage. If a pressure gage is used, multiply the reading by 2.31. Pumping level is obtained by subtracting the length of the submerged air line from the total length of the air line.

Discharge pressure is obtained at the discharge of the pump while it is operating. Multiplying the psi on the discharge pressure gage by 2.31 gives the feet of head. The pumping level in feet, plus the discharge head in feet, plus an allowance for pipe friction within the column pipe will give the total dynamic head, or TDH.

The actual delivery of the pump

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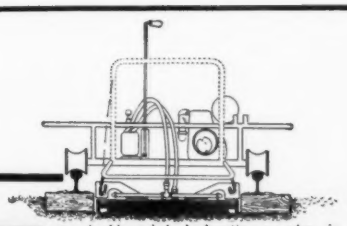
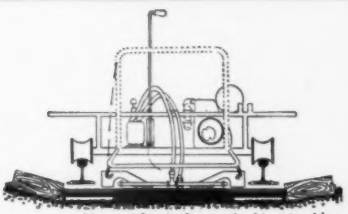


A double-ended hydraulic cylinder is then lowered into the tie bed. A simple turn of the valve moves these two pistons outward, *pushing the tie-ends completely clear of the rail—whether working with single or double shoulder tie plates!* The crib is now open—and only the necessary amount of ballast is removed to admit the new tie.



After the tie has been cut on both sides by the WOOLERY Tie Cutter, the operator of the Tie-end Remover—(who follows closely behind so that operators can assist each other in removing machines from track)—lifts the center section out with tie tongs.

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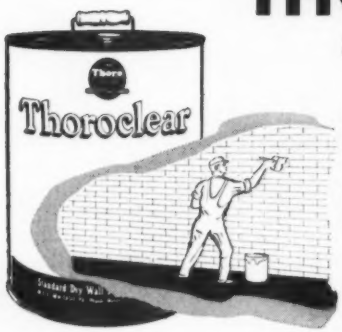

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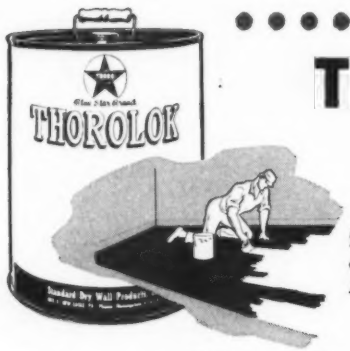

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What's the Answer (Cont'd)

may be checked in the storage tank, or, if this is not practicable, the pump may be disconnected and discharged into a barrel or other suitable container. If this last is done, the pump discharge must be throttled to equal the normal discharge pressure.

If there is a convenient way of checking kilowatt-hour consumption, the efficiency of the unit can then be determined by the following formula:

$$\text{KWH per 1000-gal water} = \frac{\text{TDH} \times 0.00315}{\text{efficiency of pump} \times \text{efficiency of motor}}$$

The results of the efficiency test can be compared with the original factory test and previous field tests and the current cost to produce 1000 gal of water can be calculated.

The presence of sand in the effluent is an indication of the condition of the well. A turbine pump cannot handle much sand for a protracted period without serious damage requiring replacement of impellers, pump shaft, shaft seal, and, in advanced stages, the entire bowl assembly, line shaft, and lineshaft bushings. Repairs should be made to the well before overhauling the pump.

If one of the following symptoms appears, consideration should be given to pulling the pump:

(1) Excessive load on motor.
(2) Excessive vibration.
(3) Appearance of water at top of the oil tube.
(4) Poor production and/or efficiency.
(5) Appearance of sand in effluent.

For the sake of convenience in repairing a turbine pump, the original column pipe should be made up in 10-ft lengths. This shortens the height of the tripod or "A" frame required to pull the pump. Other equipment required is:

(1) Power hoist or hand operated chain hoist, its capacity depending upon length and diameter of column pipe, size of motor, etc.
(2) Pipe clamps to fit column pipe (2 sets).
(3) Bowl assembly clamps (1 set).
(4) Pipe swivel, male.
(5) Chain tongs for column pipe.
(6) Pipe wrenches for oil tube and line shaft.
(7) Socket wrench set.
(8) Special wrench for oil tube tension nut (certain brands) supplied by manufacturer.
(9) Tools for dismantling bowl assembly (this varies with construction details of the pump).

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What's the Answer (Cont'd)

turer will gladly furnish installation instructions for a particular unit. These instructions are of great value to anyone not experienced in the pulling of a pump which, as an operation, is largely a reversal of the installation procedure. Certain adjustments in positioning the impellers within the bowls during re-assembly are critical for maximum efficiency and proper operation. These adjustments vary with the type, column-pipe length and construction details of each unit, and for this reason it is best to obtain and follow factory recommendations.

Dismantling a bowl assembly requires a knowledge of construction details. Some impellers are attached to the shaft by means of various types of collets. Each type requires different handling. Some impellers are keyed on, some are attached by pins and some by set screws. Some bowls are bolted together, some are screwed together, and some are screwed together and then pinned. Needless damage can be avoided by securing details of construction before attempting repairs. Some manufacturers recommend that the bowl assembly be returned to them intact for a complete overhaul.

Certain types of water attack one or more of the metals used in the bowl assembly. Cast-iron bowls should be scraped with a knife to determine whether deterioration is severe. If the cast iron can be whittled, consideration should be given to using a different type of metal, such as silicon bronze, for a replacement. Brass impellers are sometimes attacked which results in brittleness. This condition is usually eliminated by using zincless bronze.

Infrequently it is found that electrolysis causes premature failure of the unit. This is usually traced to differences in the metals used in the construction of the pump and a well water of such characteristics that an electric cell is set up which causes a plating-out of metal. If such a condition is noted, the services of a cathodic-protection engineer should be obtained.

In conclusion, the frequency of inspection of any pump will vary with its importance and its history of performance. Complete records should be kept of everything pertaining to the installation; these are invaluable when deciding upon repairs or replacements.

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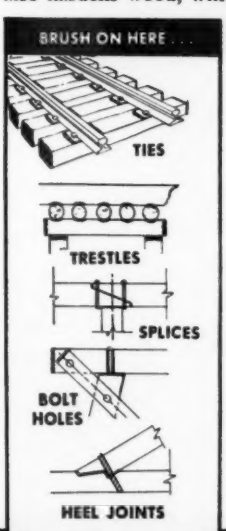

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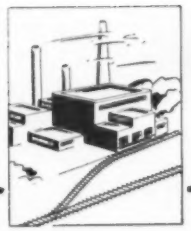

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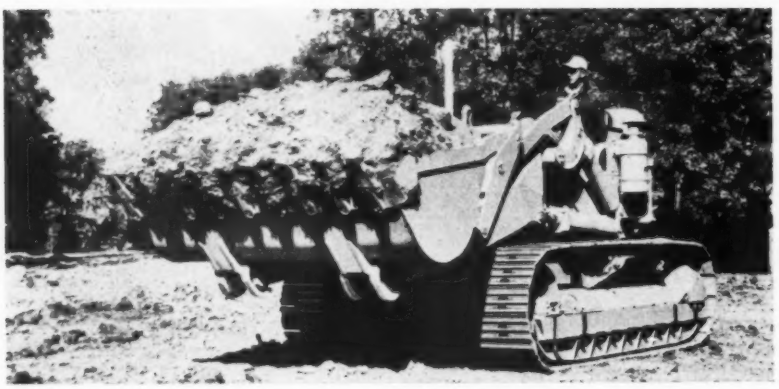


TRACTOR-SHOVEL

A NEW 100-hp, 2¼-cu yd capacity Traxcavator equipped with 40-deg bucket tipback at ground level has been announced by Caterpillar Tractor Company, Peoria, Ill. This model, known as No. 977, features a differential lever on each of the lift arms, which is said to make this tipback possible at ground level. It is further reported that heaped loads are retained in loose materials since the bucket can be driven into a stockpile, tipped back and a full load obtained at one time without declutching. The machine is equipped with an automatic kick-out on the lift valve and an automatic bucket positioner on the bucket-tip valve. This permits the operator to move the lever into tip-back position and then release it. The lever will automatically move to "hold" position when the bucket reaches digging position which leaves the operator's hands free to operate gear shift and steering controls. This positioner is adjustable and is said to provide any desired bucket digging angle.

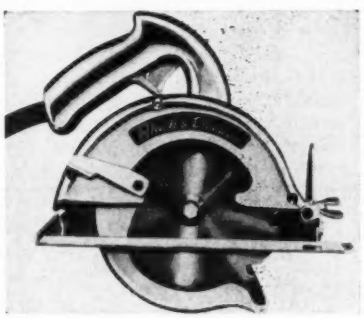
Model No. 977 is provided with a full-flow hydraulic-oil filter mounted on the left fender while the hydraulic valve and tank are mounted on the right fender. Hydraulic cylinders are mounted above the tracks and the tilt cylinders are placed low so as not to interfere with operator visibility. Diesel engine and gasoline starting engine are started from the operator's seat. A single-lever starting-engine clutch and pinion control are standard equipment as is a 6-volt starting system for the starting engine. Twenty-four volt direct electric starting is also available as an attachment.

NEW MODELS IN TRUCK SHOVELS

THE "QUICK WAY" Truck Shovel Company, Denver, Colo., has announced four new machine models. They include a 5-ton, ¾-yd unit; an 8-ton, ¾-yd machine; a 10-ton, standard ½-yd unit; and a 12½-ton, heavy-duty ½-yd machine. All of the new models are said to give greater power and better control from built-in balance with more big-shovel features.

Some of the outstanding features of the new models include (1) power up and down boom which is standard equipment on all of them, (2) anti-friction bearings on all high-speed continuous rotating shafts, (3) all chain and sprocket drives, (4) machined hook rollers and roller path, (5) air-cooled clutch and brake drum, (6) hydraulic system and clutch control, (7) lubrication with force-feed, filtered circulation and daily grease fitting centrally located on the cab, and (8) hinged fold-out panels to aid in adjustment and maintenance.

In addition, "Quick Way" is offering five new carriers designed with heavy duty specifications and specific capacities for all of the new units. A complete line of attachments, for every type of job, is available to make the models fully convertible.



HEAVY-DUTY SAW

A HAND-HELD heavy-duty power saw with a 6½-in blade has been introduced by the Black & Decker Manufacturing Co., Towson, Md. This saw is said to have a number

RACINE
Hydra-Quad TAMPER
(Patent Pending)

Just one man operates this four-tool ballast tamper

Here's a completely hydraulic machine that tamps more track per man per day . . . and does it more uniformly. One operator controls the vertical movement and lateral position of four tampers through two finger-tip hydraulic valves. *Each tamping gun acts independently to insure full compactness of ballast at all points.* All four tamping guns automatically tilt to carry ballast under the tie at proper depth. To accommodate crooked ties, the operator simply swivels the main head.

The Hydra-Quad tamper is easy to adjust for varying rail heights and wider-than-average ties. Each gun is equipped with a quick-change tamping bar holder.

Drop-down and outboard wheels insure easy removal from track. Hydraulic cylinder raises and pivots the machine. Power winch assists in rerailing. Movement from tie to tie is powered by a fluid motor that also operates the power winch.

One more flexibility feature: Off-center outrigger mounting permits two men to operate machines on opposite rails to tamp both tie ends simultaneously. Send for free folder and specifications. Address **RACINE HYDRAULICS & MACHINERY, INC.,** 2038 Albert St., Racine, Wisconsin.

Lease or time purchase plans are available.

RACINE

HYDRAULICS & MACHINERY, INC., RACINE, WISCONSIN

of important safety features which include a newly designed guard to prevent accidental tripping of the instant-release switch, an open-end handle, a built-in chip deflector, a telescoping blade guard that opens when each saw cut is started and closes when the cut is complete, and a large-size lift lever for retracting the lower guard when starting pocket cuts.

The saw is said to be fully adjustable for depth and angle of cut and is provided with a calibrated quadrant for setting off any angle from 0 to 90 deg. It is provided with large wing nuts to permit quick and positive setting of all adjustments. Air which is drawn in for the ventilation of the motor is discharged along the line of cut to keep it free from dust. The saw weighs 11 lb, has a maximum depth of cut of 2 5/32 in at 90 deg and 1 7/8 in at 45 deg. It contains ball bearings, heat-treated helical gears and is driven by a heavy-duty Black & Decker universal motor specially designed for sawing.

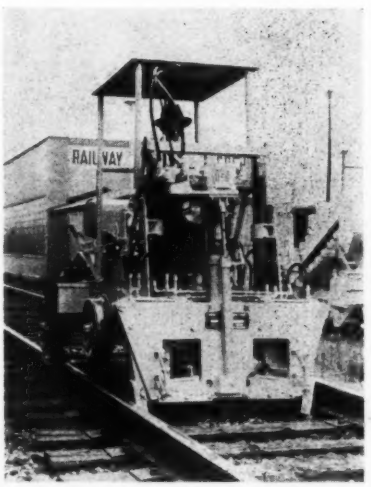
Switch point—*Closed position locked*

Automatic SWITCH POINT LOCK

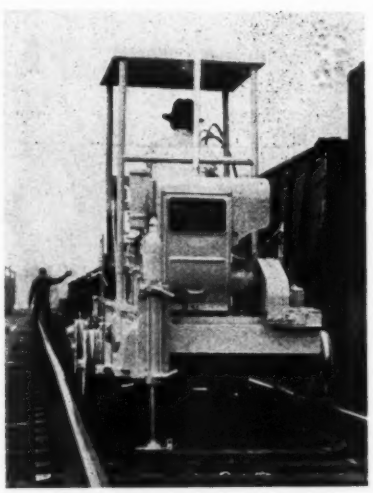
Provides SAFETY With Economy

The Automatic Switch Point Lock provides a rugged and dependable safety device in a *self-contained* unit for manually operated switches. Operated by a foot pedal which *automatically* returns to locked position when the switch stand lever is used to close the switch.

The RAILS Company
RAILS-CO
Hoboken · Chicago · St. Louis



MECHANICAL clamp anchors right rear wheel to rail. Lowered lining head raises front wheels as spud is driven into roadbed.



HYDRAULIC jack raises left rear wheel from rail. Both left wheels are then retracted providing unobstructed view of rail for man sighting.

WHEEL MOUNTED TRACK LINER

A wheel-mounted "Linemaster" has been announced by the Railway Maintenance Corporation, Pittsburgh, Pa. Based on the crawler-mounted "Linemaster" that was introduced last year, this new unit was developed to be more adaptable ofr use with mechanized gangs.

The machine is said to be able to

line up to 6,000 ft of track per day and is capable of making throws up to 6 in. in either direction. Both left wheels may be retracted to give the man sighting an unobstructed view of the rail. It is equipped with a lining "target" for use with a scope. Speeds both forward and reverse are 3 and 12 mph.

Operating sequence for an unobstructed view of the rail is as follows:

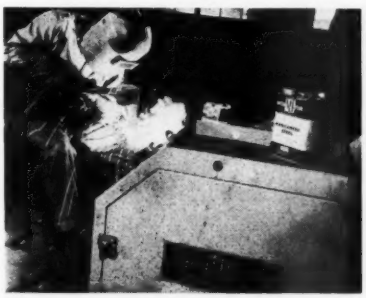
(1) Machine spotted over crib where throw is to be made; (2) mechanical clamp anchors right rear wheel to rail; (3) lining head is lowered into crib, raising front wheels off the rails, and spud is driven into roadbed for anchoring; (4) hydraulic jack raises left rear wheel off the rail and both left wheels are hydraulically retracted; (5) track is moved horizontally in either direction by hydraulic cylinders which push at the base of rails. The full operating cycle for each throw requires from 40 to 50 sec.

WELDER ACCESSORY AIDS HARDFACING WORK

The Amsco Division of American Brake Shoe Company has announced, after two years of field testing, a portable welding machine designed for manganese steel and hardfacing work and irregularly shaped parts.

The machine, known as the "MF" Welder, operates on a range current of from 150 to 450 amperes and can be plugged into conventional ac or dc units by a single cable.

As an accessory in the relatively new field of hardfacing, the "MF" serves as a semi-automatic device for feeding flux-coated welding wire to parts of machines or implements being "retreaded" with new metal after original surfaces have been worn away. The semi-automatic feature is described as enabling an inexperienced welder to lay down acceptable deposits of hardfacing without much practice.

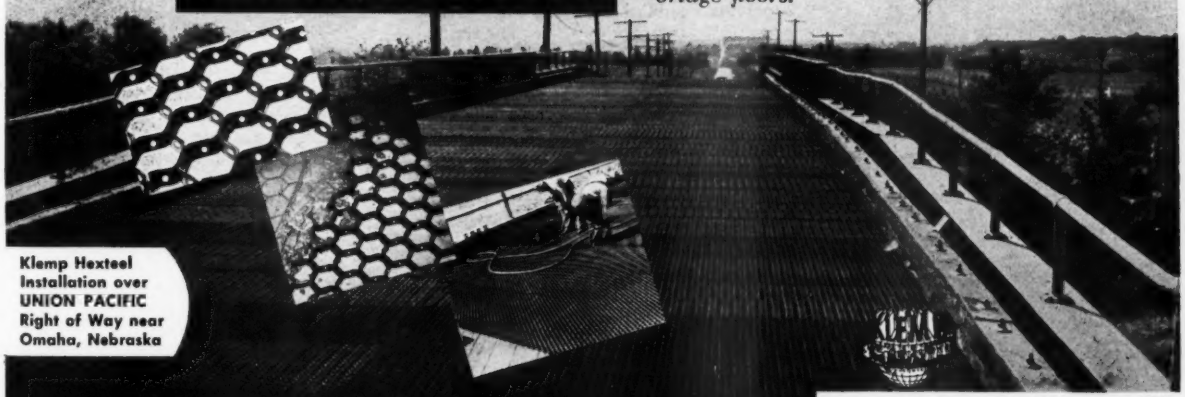


Unique features are said to include a self-feeding mechanism for keeping the welding arc constantly and evenly supplied with welding wire. Also a conical "hopper" is mounted directly above the welding wire outlet as a means of storing and feeding flux. The flux adheres to the wire by the magnetic field created by the welding current. The ratio of flux to welding wire may be controlled by changing the size of the "hopper" opening, or by variations in flux particle sizes that are available. As the welding wire serves for most types of manganese or hardfacing needs, the welder's problem of changing welding materials is simplified.

ELIMINATE costly road surface MAINTENANCE!
INCREASE the LIFE of Bridge Floors over Railroad Passings!

KLEMP HEXTEEL
STEEL FLOOR ARMOR for
Resurfacing Wood Decking

HEXTEEL heavy duty steel floor armor creates a steel surfaced floor capable of withstanding maximum moving loads. Easily installed with mastic composition or asphalt fill for resurfacing wood decking. Prolongs the life of bridge floors.



Klemp Hexteel Installation over UNION PACIFIC Right of Way near Omaha, Nebraska

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Send us data on your bridge floor and load conditions today! We will reply with estimate for your job.

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6601 South Melvina Avenue, Chicago 38, Ill.

Gentlemen:
Kindly send me a copy of your "Data and Specification Manual."

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100% Self-Contained

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GASOLINE HAMMER

ROCK DRILLS

For high-speed drilling in rock to depths of 13 ft. at rate of 2 ft. per minute. Automatic rotation of drill steels. Cleans dust and cuttings out of hole.

PAVING BREAKER

2400 powerful blows per minute do a better job and reduce job-time and fatigue, busting concrete, cutting asphalt, digging frozen ground or tamping backfill.

SPIKE DRIVER

For driving cut spikes into treated railroad ties, the SD-55 is equipped with a special nose piece and spike centering tool.

Syntron Gasoline Hammers don't need auxiliary power equipment — batteries and cables or air compressors. One man operation. Delivering 2,000 powerful blows per minute, these Syntron Gasoline Hammers reduce job time and costs.

Send for Free Catalogue

SYNTRON COMPANY

290 Lexington Ave. Homer City, Pa.

Lewis Named Publisher of S-B Railway Magazines

In a continuation and intensification of its expanding publication service to the railroad industry, Simmons-Boardman Publishing Corporation has named Robert G. Lewis—heretofore the company's director of circulation—as publisher of *Railway Age, Railway Track and Structures* and its other railway magazines. Robert C. Van Ness, Mr. Lewis' assistant in the circulation department, has been named acting director of circulation. In announcing Mr. Lewis' appointment, James G. Lyne, company president and editor of Railway Age, said:

"There is no other industry, we believe, which is served as intensively by its industry press as the railroads are by Simmons-Boardman. In addition to our weekly, *Railway Age,* now in its 100th year of service, we have the specialized monthly publications—*Railway Track and Structures, Railway Locomotives and Cars, Railway Signaling and Communications,* and *Railway Freight Traffic.* Each of these papers is pin-pointed to an important specialized audience within the industry. We are now about to begin a quarterly publication, in Spanish, *Selecciones del Railway Age,* to introduce and publicize North American railway standards and practices, primarily in Latin America.

"The publishing function for these magazines—coordination of editorial, advertising and circulation operations—has heretofore been a responsibility of top management. With the expansion of the industry and our publication service to it, the coordinating functions of a full-time publisher are now imperative.

"The responsibilities and duties of department heads of our railway publications have not been altered in the slightest. J. S. Crane continues as our senior sales authority, and J. R. Thompson as our director of advertising sales. The responsibility of W. H. Schmidt, Jr., executive editor of *Railway Age* and editorial director of the other railway publications, is unaltered." Mr. Lyne added that, as editor of *Railway Age,* he intends to continue his editorial writing and other activities related to industry policy, and to intensify his work with the railway papers.

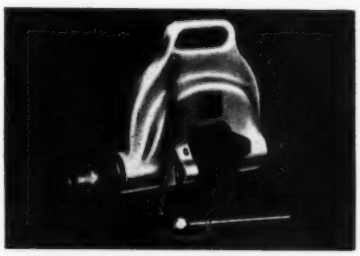
In assuming his new duties, Mr. Lewis said:

Robert G. Lewis

"The railroads have reached a new high level of dynamic improvement. At no time in history has their physical and organizational advancement proceeded at such a brisk tempo as now. Never before have they been so receptive to new ideas and new products—all of which adds up to the conclusion that the constantly improving editorial and circulation coverage provided by *Railway Age* and its associated magazines is more necessary than ever to the industry, and to the manufacturers serving the industry. The railroads are a revitalized business, with every promise of becoming an outstanding 'growth industry' and we at Simmons-Boardman intend to keep our publication operations in the vanguard of the industry's progress."

Mr. Lewis, in addition to his outstanding career in circulation work with Simmons-Boardman, also has a background of editorial experience, having been a *Railroad Age* editor before he transferred to circulation in 1950. A Philadelphian, 39 years of age, Mr. Lewis began his business life as a railroad man. He had 12 years of service with the Pennsylvania Railroad, in the personnel, transportation, and freight traffic departments—and in the purchasing and wage schedules departments of the Bessemer & Lake Erie—before joining Simmons-Boardman in 1947. He served four years with the U. S. Naval Reserve, during and immediately after World War II; and is a past president of the National Circulation Round Table of Associated Business Publications, Inc.

SETS NEW RECORDS IN RAIL LAYING



VELOCITY POWER RAIL PUNCH
Takes only an instant to punch clean, smooth hole for track bolts or rail bonds. Needs no electricity, compressed air, hydraulic power; operates from small blank cartridge; no open flash or recoil. Only one major moving part, the piston.

MECO POWER RAIL LAYER

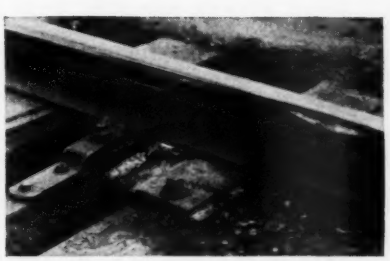
Makes new records in Time Saving! This machine greatly speeds up the laying of rails of every weight and length. Makes new records in Economy! The Meco Power Rail Layer is inexpensively operated by a standard 4-cycle power unit, usually with a machine crew of 3 or 4 men.

A Meco easily sets in the rails for a large gang of 100 men or more. And—the first cost is only a fraction of that for other rail laying machines.

Maintenance Equipment Company
RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

R-996RR

MECO RAIL AND FLANGE LUBRICATOR
Doubles to quadruples curve rail and locomotive wheel flange life, by reducing friction between rails and wheel flanges on curves. Also makes possible higher speeds with greater safety.



MACK REVERSIBLE SWITCH POINT PROTECTOR
Prolongs the life of switch rails about 4 times; then is reversed and again extends the switch rail life for another similar period.

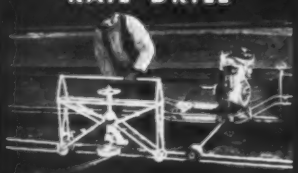
TYLIFE
Improves track structure . . . increases tie life. Provides greater holding power in cross-ties and bridge timber; reconditions old spike-worn holes; reduces labor of re-gauging and re-spiking.

Mall TOOLS
CUT YOUR TRACK MAINTENANCE COSTS

FROG & SWITCH GRINDER

RAIL SLOTTER

RAIL DRILL



RAIL GRINDER

IMPACT WRENCH

MALL has pioneered in the development of specialized tools — tools that reduce costs, increase efficiency and gets work done faster, easier and cheaper. Cut your railroad costs today! Use MALL Tools!

MALL TOOL COMPANY

PORTABLE POWER TOOLS
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7738 South Chicago Ave., Chicago 19, Ill.
Tell me more about money-saving MALL Railroad Tools.

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THE MONTH'S NEWS...

. . . among railway men—the associations—the suppliers

General

John P. Hiltz, Jr., general manager of the Delaware & Hudson has been elected vice president operation and maintenance with headquarters at Albany, N. Y. Mr.

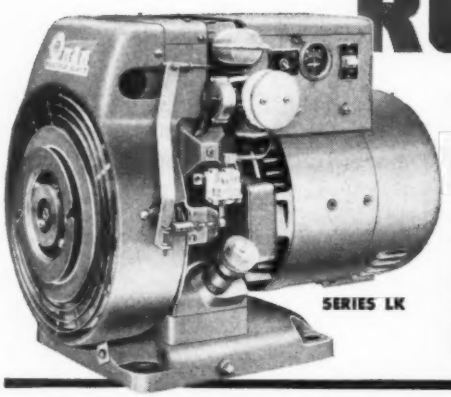
John P. Hiltz, Jr.

Hiltz was born at Baltimore, Md., on September 8, 1911. He attended Baltimore Polytechnic Institute and the Carnegie Institute of Technology, receiving a BS degree in civil engineering from the latter in 1934. Entering railroad service with the Pennsylvania on June 15 of that year as an assistant in the engineer corps, he subsequently served on that road as assistant in the office of the comptroller and in the real estate department, and as assistant supervisor of track and supervisor of track on the Long Island at Jamaica, N. Y. In March 1945, Mr. Hiltz went with the Lackawanna as engineer of track at Scranton, Pa. and in March 1948 was advanced engineer maintenance of way. He joined the New York Central in February 1953 as chief engineer maintenance of way and in March 1955 he went with the Delaware & Hudson as general manager which position he held until his recent appointment.

Engineering

J. D. Worthing, office engineer on the Northern Pacific at St. Paul, Minn., has been appointed assistant engineer of construction on a new 19-mile track relocation project near Noxon, Mont. **R. W.**

RUGGED
is the word for this
New ONAN
2,000-WATT
ELECTRIC PLANT



Put it to work on your toughest jobs!

PORTABLE POWER
Stands up under rough handling. Carry it, wheel it, or truck it.

PRIMARY POWER
Runs longer in continuous service. Dependable, economical.

Built to stand up where others can't! Powered by Onan 4-cycle, one-cylinder gasoline engine with Stellite-faced exhaust valve, longer-wearing bearings, efficient air-cooling. Onan all-climate generator is direct-connected. Compact, lightweight. Conservatively rated; economical operation. 115 or 230 volts, A.C. Recoil starter, electric starting, or automatic start and stop. Wide range of accessories. Other Onan models: 500 to 50,000 watts.

Write today for Special "LK" folder!

Onan ELECTRIC PLANTS
D. W. ONAN & SONS INC.
3730 UNIVERSITY AVE. S.E. • MINNEAPOLIS 14, MINNESOTA

Humphreys, assistant engineer, succeeds Mr. Worthing as office engineer.

Albert G. Humphries has been appointed water and fuel engineer for the Southern Pacific with headquarters at San Francisco, Calif. **Charles G. Kaehms** has been appointed electronics engineer with headquarters also at San Francisco.

T. R. Klingel, engineer maintenance of way of the Soo Line at Minneapolis, Minn., has been appointed assistant chief engineer maintenance of way at that point. **A. S. Krefting,** assistant chief engineer, has been appointed assistant chief engineer bridges and structures, with headquarters as before at Minneapolis.

T. R. Klingel

Mr. Klingel was born at St. Paul, Minn., April 21, 1915. He began his railroad service with the Soo Line in 1937 following his graduation from the University of Minnesota. He served as a rodman until September 1938 at which time he obtained a leave of absence in order to return to the University of Minnesota for graduate study. In June 1940 he returned to the railroad as assistant engineer, and was later promoted to engineer of maintenance and division engineer. In 1947 he again left the Soo Line to become an associate professor of civil engineering at the University of Minnesota and served in that capacity until September 1951 when he returned to the railroad as principal assistant engineer. He was named engineer maintenance of way in 1954.

J. L. Cox, engineer maintenance of way on the New York Central at New York, has been appointed district engineer, Eastern district, at that point. **Lyle Bristow,** assistant engineer maintenance of way, Cleveland, Ohio, has been named district engineer, Western district, with the same headquarters. **A. A. Keever,** assistant engineer maintenance of way on the Big Four, has been appointed district engineer, Southern district, with headquarters as before at Indianapolis, Ind. **C. T. Popma,** industrial engineer at New York, has been named district engineer, Northern district, with headquarters at Detroit, Mich. **J. R. Scofield,** assistant engineer maintenance of way, Michigan Central, has been appointed deputy district engineer, Northern district, with headquarters also at Detroit. **C. C. Herrick,** division engineer, Cleveland division, has been appointed assistant district

There's a SIMPLEX JACK to Do Every RAILROAD JOB Faster-Easier

Fast Acting TRACK JACKS

15 ton capacity. The jacks set much more firmly and stand straighter under tie (without damage) or rail, due to large area toe lifts. Trip from either side. Two models have light weight aluminum housings.

ALSO: Tie removers and replacers.

Standard Speed BRIDGE JACK

The new A2515 25-ton jack has an aluminum alloy housing, which weighs only 40 pounds. 9-in. lift eliminates re-setting in bridge work. Recommended for use with jack support.

ALSO: A complete line of hydraulic jacks and pullers.

Ratchet Lowering LEVER JACKS

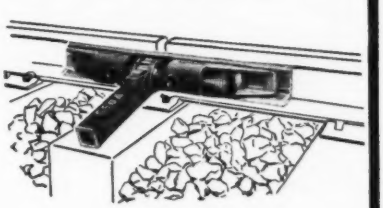
Ideal for lining, shimming, painting, replacing timber decks, pulling headed bolts (½" to ⅞") etc. Available with 3¾" or 5" wide base for use between ties on trestles. Equipped with a 5' chain fitted with a grab hook on one end and a bolt puller on the other.

ALSO: Push and pull jacks for piling.

Time-Saving TIE SPACER

Straightens, Spaces Ties. Pumps Rails. Easily applied and removed. Slides along top of rails.

RAIL EXPANDERS for the Maintenance and Signal Departments



Permits *one* man to replace a rail pounding crew! For lining crossings and switches, pushing or pulling continuous rail, controlling expansion or contraction with no interruption of service. With lever socket locked down, nothing protrudes above rail head.

Pole Pulling and Straightening Jacks for the Signal Department

Two sizes, 5 and 15 tons for pulling or straightening all sizes of poles. Pivots on base, when desired, to any angle. Can also be used for guy wire tightening or for pulling underground cable. Model A1538—15-ton capacity—available with aluminum housing which reduces weight 35 pounds.

ALSO: Cable Reel Jacks for drums 30- to 96-in. diameter.

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX JACKS

RE-MO-TROL UTIL-A-TOOL JENNY ROL-TOE

Write for Details in Bulletin RR 55

TEMPLETON, KENLY & CO. • 2543 Gardner Road, Broadview, Illinois

YOU don't need a lot of on-track equipment to handle scattered maintenance-of-way jobs. One man, working alone with an off-track D Tournapull, can often complete dirtmoving and material handling assignments that take an entire work train and crew. This "railroad handyman" drives anywhere under its own power. A phone call starts it out via track, right-of-way, or public highway. 25 miles is only about an hour away. It self-loads on the small jobs, can be push-loaded in fleet operation. It handles long or short hauls, spreads fill or ballast.

You can have confidence in the D Tournapull. It has been in production since 1948. Thousands of these handy dirtmovers are being used by contractors, mines, loggers and industries all over the world. Many are in use today on maintenance and construction projects for railroads in both the USA and abroad. This rubber-tired tractor-scraper is built by LeTourneau-Westinghouse, a wholly-owned subsidiary of Westinghouse Air Brake Company. That name on any type of equipment has been synonymous with quality, safety and satisfactory railroad service for nearly one hundred years. For proof of what D Tournapull can do for you, ask for a demonstration. Send for details today.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-691-RR-z

FREE . . . "The Railroad Handyman"

20-page book shows how 7-yd. self-loading D Tournapull cuts time and costs on right-of-way maintenance. Send for your free copy. No obligation. Also ask to see our color movie, "Clear the Track."

LeTourneau-WESTINGHOUSE Company
Railroad Sales Division
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

Railway Personnel (Cont'd)

engineer, Western district, with headquarters as before at Cleveland, Mr. Herrick is succeeded by **R. W. Orr,** assistant division engineer on the Big Four at Springfield, Ohio, and in turn has been succeeded by **John Revie.**

W. J. Kernan, assistant engineer maintenance of way, Buffalo & East, has been appointed assistant district engineer, Eastern district, with headquarters at Syracuse, N. Y.

T. F. Burris, chief engineer of the Chesapeake & Ohio, Northern region, whose temporary assignment to special duty in the office of the chief engineer, Southern region was announced recently (*RT&S, Jan. p. 60*), has been appointed chief engineer of the Southern region with headquarters at Richmond, Va. Mr. Burris succeeds **L. T. Nuckols** who has retired. **E. T. Rucker,** who has been acting chief engineer, Northern region, in the absence of Mr. Burris (*RT&S, Jan. p. 60*) has been appointed chief engineer of the Northern region.

Mr. Nuckols was born in Hanover County, Va., on December 12, 1890. He began his railroad service with the South & Western (now Clinchfield) as a tapeman and subsequently held positions

L. T. Nuckols

of levelman, transitman and assistant resident engineer on location and construction for this road and the Louisville & Nashville. In October, 1916, he joined the Chesapeake & Ohio as a resident engineer, construction department, and in 1923 he was promoted district engineer in that department. He was appointed assistant division engineer, maintenance department, in 1932 and successively held positions of division engineer, engineer of track, assistant chief engineer construction and engineering, engineer maintenance of way and chief engineer, Chesapeake district. In 1954, Mr. Nuckols was appointed chief engineer, Southern region, which position he held until his retirement.

B. J. Gordon, assistant division engineer on the New York Central at Columbus, Ohio, has been promoted to division engineer, Buffalo division, at Buffalo, succeeding **F. B. Wilcox** who has retired. **I. N. Wigle** succeeds Mr. Gordon. **Wolters Ledyard,** assistant division engi-

neer at Cleveland, has been promoted to division engineer, Ohio Central division, with headquarters at Columbus, succeeding **W. H. Goold,** who has been transferred to the Electric division at New York. **C. F. Hunt** succeeds Mr. Ledyard. **C. C. Lathey,** division engineer at New York, has been transferred to the St. Lawrence division, with headquarters at Watertown, N. Y. **R. F. Lawson,** division engineer on the Big Four at Mattoon, Ill., has been appointed division engineer of the Western division, Western district, and the West division of the Northern district, with headquarters at Chicago. Mr. Lawson succeeds **G. W. Deblin,** who has been promoted to assistant district engineer at Indianapolis. **R. K. Pattison** has been appointed division engineer succeeding Mr. Lawson. **W. G. Curtis,** division engineer, Mohawk Division at Albany, N. Y., has been appointed assistant district engineer, Eastern district, with headquarters at Syracuse, N. Y. **T. Burrell** has been appointed assistant division engineer, Buffalo division, with headquarters at Buffalo and **R. J. Hardenbergh** has been appointed assistant division engineer, Pennsylvania division with headquarters at Jersey Shore, Pa. **J. E. Rosenbaum** has been appointed assistant division engineer at Springfield, replacing **John Stang** who has been promoted.

H. C. Tunison, assistant engineer maintenance of way for the Lehigh & New England, has been promoted to chief engineer with headquarters at Bethlehem, Pa., succeeding **H. E. Jones** who has retired.

John T. Hiner, division engineer on the Southern at Bristol, Va., has been transferred to Greenville, S. C. **Norman M. Cary,** supervisor bridges and buildings at Greensboro, N. C., has been promoted to division engineer at Bristol succeeding Mr. Hiner. **John W. McPherson,** track supervisor at Charlottesville, Va., has been promoted to assistant division engineer at Greenville.

J. C. Brennan, division engineer on the Delaware & Hudson, will have jurisdiction over the engineering department of the newly formed Pennsylvania-Susquehanna division with headquarters as before at Oneonta. The new division is a consolidation of the Pennsylvania and the Susquehanna divisions.

Orville W. Stephens, assistant to chief engineer maintenance at Albany, N. Y., has been appointed engineer maintenance of way with the same headquarters. **R. J. D. Kelly,** construction engineer, has been appointed assistant to chief engineer with headquarters at Albany. **Howard B. Clarkson** has been appointed engineer of structures and **Cary C. Tubbs,** assistant engineer, has been appointed office engineer, both with headquarters at Albany. **Harry E. Schultz** and **Walter H. Parnell** have been appointed office engineers with their respective headquarters at Albany and Oneonta, N. Y. **Edward Penrose,** engineer of structures, and **Clarence W. Christen,** designing engineer, both with headquarters at Albany, have retired from active service.

Versatile Tournatractor spreads ballast, "daylights" curves, cleans ditches, backfills around culverts and bridge abutments, levels crossings, grades for sidings.

"Go-anywhere" tractor

speeds maintenance, cuts traffic delays

Tournatractor speeds dozing, pulling, pushing tasks anywhere. Rubber-tired mobility lets you drive on highways or the right-of-way; handle work on, off or across the tracks. You eliminate work train service, and mainline delays, because operator simply gets on and drives job-to-job at a moment's notice. This speeds service, saves time.

Because Tournatractor gets out of the way fast, it does not tie up rail traffic while cleaning drainage ditches or landslides, cutting down banks, spreading cinders, ballast, preparing grade crossings, etc. It requires no work train, no train crew, no loading and unloading delays. Operator simply drives out to the job, cleans up the dirt to be moved, goes on to the next assignment. Your regular maintenance-of-way crew can become competent operators in a short time.

Before you buy any tractor, it will pay you to get all the facts on high-speed, rubber tired Tournatractor.

Tournatractor—Trademark T-788-RR-z

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Red-Company
30 Church Street

PHILADELPHIA, PENNSYLVANIA
Furnival Machinery Company
Lancaster at 54th Street

WASHINGTON, D.C.
J. B. Akers, Jr.
1102 Dupont Circle Building

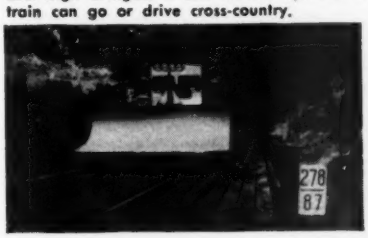
CLEVELAND 13, OHIO
The Cox-McGeorge Co.
Marshall Bldg.

ST. LOUIS, MISSOURI
R. E. Bell Company
2089 Railway Exchange Building

DENVER
Lloyd's Railway Supplies
401 Mercantile Bldg.

SAN LEANDRO, CALIFORNIA
W. A. Blackford
802 Cary Drive

Sure-footed Tournatractor safely crosses trestles and high bridges. It can travel anywhere a train can go or drive cross-country.



LeTourneau-WESTINGHOUSE Company
Railroad Sales Division
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

7 reasons why...

No other crane gives you Tournapull-Crane's revolutionary lift-and-carry operating advantages for all-around load handling and "roustabout" crane service. This completely mobile unit is capable of lifting, carrying and placing heavy loads from any *footing*. With versatility of many interchangeable tools, it has operating and maintenance cost of only *one*. Check these 7 exclusive features, then let us show you proof of Tournapull-Crane's ability to make and save money for you!

1 **Powered mobility**... prime-mover's powerful diesel, torque-proportioning differential, plus flotation of 4 big, low-pressure tires, carry full loads over tracks, yards, pavement, blacktop, soft fill, etc. Travels job-to-job via highway, along right-of-way, or straddling the rails.

2 **Makes 90° turns** left or right, has power-steer plus independent-drive. Gives you accurate, simplified load-placing in restricted areas with minimum maneuvering. No other crane has similar versatility and ease of load handling.

3 **Stability without outriggers** ... safely counter-weighted by entire prime-mover, this crane lifts and carries its rated loads. Tournapull-Cranes can carry loads on short boom and short line with no dangerous swinging. Working off-track, it makes an excellent clean-up tool for derailments, and for many bridge and trestle repairs.

4 **Three-way crane action** ... with or without load, boom can be raised or lowered, extended or retracted ... hoist-block raised or lowered by powerful electric motors operating singly or together for fast, safe spotting. Power-action up-and-down avoids jerking, handles load safely.

5 **Travels, lifts under low overhead** ... will reach into 9'2" doorway with boom lowered. Can work inside shops, warehouses. Can reach inside box-cars to remove heavy loads. Reaches under overhead structures, through low doors, under bridges, through ship gangways. Additional interchangeable booms available for special applications.

6 **Finger-tip control** ... no levers to "fight". Dashboard electric switches control lift and steer, make operation easy and simple. Operators can be trained in a few hours.

7 **Few parts, low maintenance** ... no complicated operating and driving mechanism. Tournapull-Crane operations are controlled by small, compact interchangeable electric motors. Rugged box-beam construction of carriage and boom stands up under extreme loads.

Contact your LeTourneau-Westinghouse Distributor ... he'll be glad to tell you all about Tournapull-Cranes, give you information on interchangeability with other earthmoving and hauling tools, give multi-purpose range of operations, increase savings for you.

Tournapull—Trademark Reg. U.S. Pat. Off. C-1016-RR-z

Tournapull-Cranes are available in three sizes	MODEL D	MODEL C	MODEL B
WHEELBASE	16'	30'	29'3"
HORSEPOWER	138	208	293
MAX. LIFT	10 tons	20 tons	30 tons

LeTourneau-WESTINGHOUSE Company
Railroad Sales Division
Peoria, Illinois
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Railway Personnel (Cont'd)

M. E. Lau, general roadmaster on the Rock Island at Kansas City, Kan., has been promoted to district maintenance engineer, First district, with headquarters at Des Moines, Iowa. Mr. Lau replaces **R. B. Fetters** who has been appointed division engineer at El Reno, Okla. Mr. Fetters replaces **G. A. Carroll,** who has retired.

Track

H. N. Lucas has been promoted to track supervisor Southeastern Region of the Pennsylvania, with headquarters at Indianapolis, Ind.

G. C. Payne, assistant general foreman bridges and buildings, on the Frisco at Tulsa, Okla., has been promoted to roadmaster, 40 track division, with headquarters at Enid, Okla. Mr. Payne succeeds **E. Eskengren** who has been transferred to Springfield, Mo., replacing **W. E. Brockmeier** who has been transferred to Newburg, Mo. **O. L. Malone,** roadmaster at Newburg, has been transferred to Chaffee, Mo., replacing **J. O. Elliott** who has been transferred to Ft. Smith, Ark., replacing **R. E. Catlett** whose promotion to assistant division engineer is announced elsewhere in these columns.

C. L. Holdaway, assistant district gang foreman, Southwestern division, has been promoted to assistant roadmaster with headquarters at Tulsa, and **S. L. Owen** has been appointed assistant roadmaster with headquarters also at Tulsa.

R. P. Scott, general roadmaster on the Rock Island at Des Moines, Iowa, has been transferred to Kansas City, Kan., replacing **M. E. Lau** whose promotion to district maintenance engineer is announced elsewhere in these columns. Mr. Scott is succeeded by **J. W. Shurtleff,** general roadmaster at Des Moines, **M. C. Blaser,** roadmaster at Fairbury, Neb., has been promoted to general roadmaster succeeding Mr. Shurtleff. **H. D. Huffman,** roadmaster at Eldon, Iowa, replaces Mr. Blaser.

J. C. McConnell, track supervisor, has been promoted to roadmaster with headquarters at Iowa City, Iowa. **P. A. Schmidt,** track supervisor at Dallas, Tex., has been appointed acting roadmaster at Fordyce, Ark., replacing **M. H. Bootjer** who is on leave of absence because of illness.

Theodore Hasslinger, James M. Lucy and **Walter J. Shimer** have been appointed roadmasters on the Delaware & Hudson with their respective headquarters at Albany, N. Y., Plattsburg, N. Y., and Carbondale, Pa. **John F. Ryan,** track supervisor at Plattsburg, has retired after 52 years of service.

Fred H. Radford, assistant track supervisor on the Southern at Charlotte, N. C., has been promoted to track supervisor at Batesburg, S. C. **A. Marvin Jones,** assistant track supervisor at Helena, Ga.,

has been promoted to track supervisor at Jesup, Ga., and **Sam M. Sims, Jr.,** has been appointed track supervisor at Somerset, Ky. **Joseph T. Stevens,** assistant track supervisor at Marion Jct., Ala., has been transferred to Jackson, Ala. **Ollie Orange** has been appointed assistant track supervisor at Selma, Ala. and **James N. Tames** has been appointed asisstant track supervisor at Wilton, Ala.

Bridge & Building

Frank Ryan has been appointed general foreman bridges and buildings, Morris and Essex divisions, the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J. Mr. Ryan succeeds **Chris H. Kiernan** who has retired. **Reginald Paquet** has been appointed assistant general foreman bridges and buildings, Morris and Essex divisions, with headquarters at Hoboken.

Maurice A. Clancy has been appointed supervisor of steel construction for the Delaware & Hudson with headquarters at Green Island, N. Y. **Warren J. Hopson** has been appointed bridge and building master with headquarters at Colonie, N. Y.

Water Service

Allen W. Cruikshank has been appointed plumbing and heating supervisor for the Delaware & Hudson with headquarters at Albany, N. Y.

Special

J. A. Pruett, has been appointed general fire prevention inspector on the Texas & New Orleans with headquarters at Houston, Tex., succeeding **E. L. Tallichet** who has retired.

Esley E. Norton has been appointed assistant supervisor of work equipment on the Delaware & Hudson with headquarters at Colonie, N. Y. **Simon O. Cutler,** general fire inspector, has retired after 35 years of service.

Obituary

John M. Nicholson, chief engineer of the Long Island until his retirement in November 1954, died January 8 at St. Vincent's Hospital in New York.

Association News

Mississippi Valley Maintenance of Way Club

The February meeting of the club, to be held on the 13th at the DeSoto Hotel, St. Louis, will be featured by a panel

One man and a modern grader

can often do work of an entire section-crew

Maintenance jobs along your right-of-way, now handled by hand labor, shovel, or dragline crews, can be handled by one man and a modern motor grader. You don't need an on-track gang car to transport a crew, or a work-train to haul equipment... the off-track Adams grader drives via highway or right-of-way from one work area to the next as soon as called.

An Adams is a big help in keeping maintenance up-to-date... fixes troubles while they are small... saves expense and delays involved in postponement for work-train service.

Use the Adams to cut and clean ditches, slope banks, widen shoulders, spread ballast, level fills, grade access roads, build grade for sidings, remove brush and weed growth, clean-up around water towers, coal docks, shops, all types of stockpiles, and yards.

Has more speeds than other graders

All Adams graders have 8 speeds forward up to 25 mph (11 speeds including 3 optional creeper gears) and 4 in reverse to 13 mph. *No other grader offers the wide range of operating speeds found in the Adams line.*

Double-action hydraulic brakes mean fast, sure stops. When service brake on wheels is applied, brake holds transmission at same time wheels are stopped. Machine won't slip on grade.

Optional equipment adds to usefulness of grader. Scarifier rips out old asphalt, hard-packed dirt, roots and stones. Snow plow and wing clear and spread snow during winter months. Dozer blade roots out brush, pushes debris off right-of-way, backfills around culverts, cleans up spillage in yards.

Ask us to show you a modern Adams grader at work. See for yourself how an Adams can do *more* work, in *less* time, at *lower* cost.

A size ADAMS for every need

Model 330 — 80 hp, 20,500 lbs.
Model 440 — 104 hp, 21,500 lbs.
Model 550 — 123 hp, 23,500 lbs.
Model 660 — 150 hp, 27,730 lbs.

TraveLoader—high-speed, heavy-duty, self-propelled, belt-type loader for picking up and piling into trucks from windrows or stockpiles. 55 hp, 17,500 lbs.

AG-23-RR-x

LeTourneau-WESTINGHOUSE Company
Railroad Sales Division
Peoria, Illinois
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discussion of weed control methods. A. B. Chaney, assistant chief engineer—maintenance, Missouri Pacific Lines, will act as the moderator.

Roadmasters Association

The next meeting of the Executive Committee will be held at the Palmer House, Chicago, on March 12, the day preceding the opening of the AREA convention. The meeting will begin at 9 a.m. and close with luncheon at noon. It will be held in a room that has been reserved for four days for the use of Roadmasters' subjects committees which may wish to hold meetings during that period.

Bridge & Building Association

The Executive Committee of the Association will hold a meeting at the Engineers' Club, Chicago, on March 12. It will start with a luncheon and will extend into the afternoon. The meeting is being scheduled at that time so that members of the Executive Committee may have an opportunity to attend sessions of the AREA convention which will start on the following day at the Palmer House in Chicago.

American Railway Engineering Association

A tentative skeleton program is now available for the annual convention of the American Railway Engineering Association to be held at the Palmer House, Chicago, March 13-15. The program shows the schedule of committee reports to be presented but indicates only a few of the addresses. It is as follows:

Tuesday, March 13, 1956
Grand Ballroom 9:30-12:00
Address by President O'Rourke
Reports of Secy. and Treas.
Greetings from the Signal Section
Greetings from the Electrical Section
Special Addresses
Grand Ballroom, 2:00 to 4:55
Reports of Committees
20—Contract Forms
11—Records and Accounts
14—Yards and Terminals
16—Economics of Railway Location and Operation
25—Waterways and Harbors
9—Highways
Wednesday, March 14
Red Lacquer Room, 9:00 to 12:00
Reports of Committees
13—Water, Oil and Sanitation Services
24—Cooperative Relations with Universities
7—Wood Bridges and Trestles
28—Clearances
30—Impact and Bridge Stresses
8—Masonry
15—Iron and Steel Structures
Association Luncheon, 12:00 noon
Grand Ballroom
Announcement of results of election of officers
Address
Red Lacquer Room, 2:30 to 5:20
Reports of Committees
29—Waterproofing
17—Wood Preservation
6—Buildings
27—Maintenance of Way Work Equipment
22—Economics of Railway Labor
Special Committee on Continuous Welded Rail
Thursday, March 15
Grand Ballroom, 9:00 to 12:30
Reports of Committees
3—Ties
5—Track
1—Roadway and Ballast
4—Rail
Closing Business
Installation of Officers

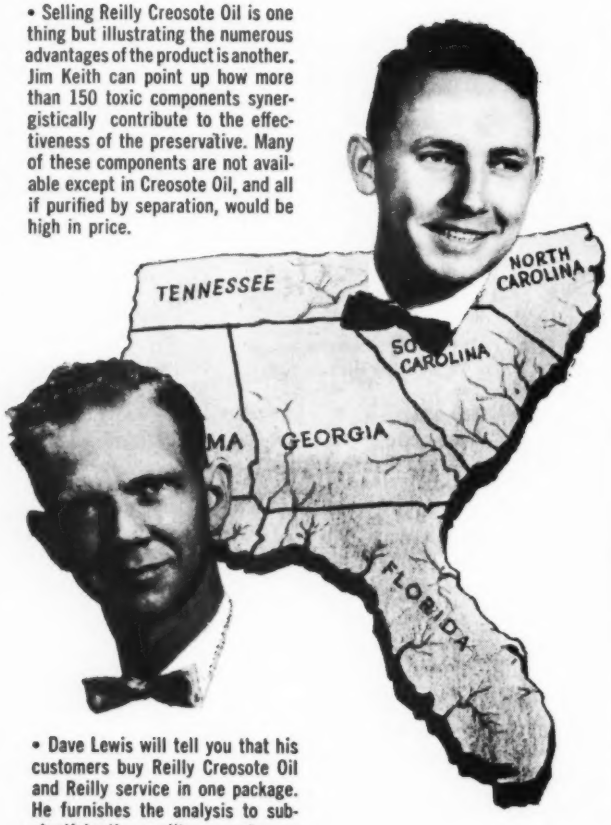
Northwest Maintenance of Way Club

The February meeting of the club will be held on the 16th at the Midway Civic Club, 1931 University Avenue, St. Paul, Minn. The principal speaker will be H. C. Fox, process engineer, Southern, who will exhibit pictures showing the latest developments in mechanized gang organization on his road.

WHEN IT COMES TO SERVICE

COME TO REILLY

• Selling Reilly Creosote Oil is one thing but illustrating the numerous advantages of the product is another. Jim Keith can point up how more than 150 toxic components synergistically contribute to the effectiveness of the preservative. Many of these components are not available except in Creosote Oil, and all if purified by separation, would be high in price.



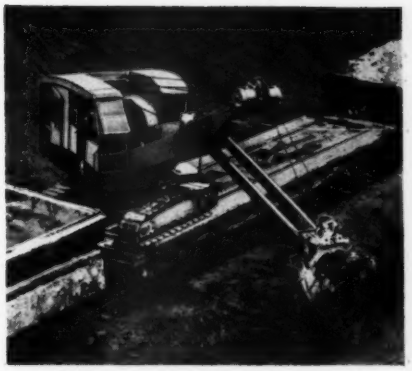
• Dave Lewis will tell you that his customers buy Reilly Creosote Oil and Reilly service in one package. He furnishes the analysis to substantiate the quality, operates an expediting service to insure scheduled delivery. Dave's customers like it and you will too.

Reilly COAL TAR PRODUCTS

Reilly Tar & Chemical Corporation
MERCHANTS BANK BUILDING, INDIANAPOLIS 4, INDIANA
ALTON PARK, CHATTANOOGA, TENN.
Sales Offices in Principal Cities

WORK ON OR OFF-TRACK with Koehring self-propelled RailAid®. It travels at 20 m.p.h. rail speed, gets on or off-track in 10 minutes. Lifts 6.9 tons on car, 8.9 tons on ground, converts to clamshell, dragline, piledriver, ½-yd. shovel, hoe.

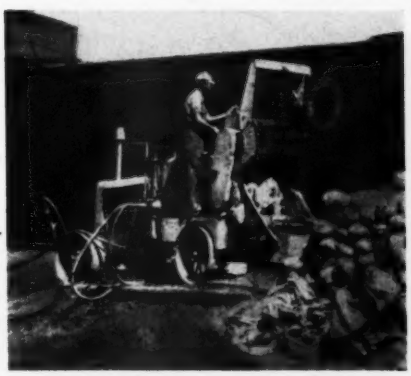
GET MORE WORK CAPACITY on work trains or independent off-track operation. Check all 5 sizes of Koehring heavy-duty excavators, with standard attachments for any construction, maintenance, and material-handling applications.

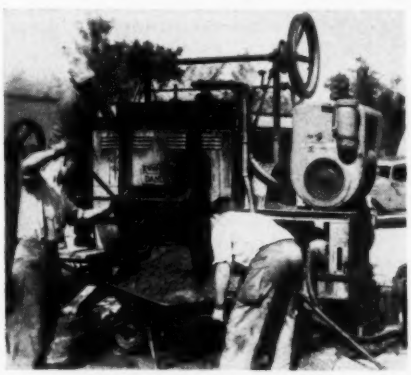


Have you overlooked any of these IDEAS?

LOAD BALLAST, RIP-RAP from track-side pits and quarries into rail cars with Koehring Dumptors®. This 6-yard hauler has one-second gravity-dump (no body-hoist maintenance), 24% gradeability — has same speeds forward and reverse.

STABILIZE TRACK BEDS, correct softened ballast pockets in sub-grade, high fills and trestle ends with Koehring Mud-Jack®. Pumps soil-cement slurry into the weakened area, leaves firm sub-grade. No interruption to rail traffic.



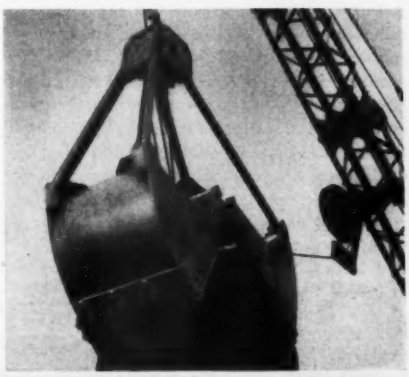


MAINTAIN SMOOTH CROSSINGS, pave platforms, parking areas, walks with Kwik-Mix bituminous mixer. Sizes: 10 and 14 cu. ft. Mobile rubber-tire mounting. Adaptable as stationary central-mix plant, skid-mounted on platform.

MECHANIZE MATERIAL-HANDLING with Kwik-Mix Moto-Bug®. It's three tools in one — has interchangeable ½-ton (6-foot) fork lift, 10 cu. ft. hopper, and ¾-ton platform. Larger size also available with multiple attachments.

SPEED C.T.C. SYSTEMS — On installation of underground cables and conduits, Parsons utility-size Trenchmobile® digs up to 14½ feet of trench per minute. Widths, 8 to 16 inches. Depths to 5 feet. Has 12.6 m.p.h. rubber-tired mobility.

LOAD, UNLOAD CARS, stockpile materials, clean ditches with Johnson all-welded clamshell buckets. Wide-rehandling, general-purpose, and heavy-duty-digging types. In 10 sizes from ⅛ to 3 cubic yards.



.... KOEHRING Company MILWAUKEE 16, WIS. Subsidiaries PARSONS KWIK-MIX • JOHNSON

Supply Trade News

General

H. K. Porter Company has acquired **Henry Disston & Sons, Inc.,** manufacturers of saws, files, bar and sheet steel, hand tools, machine knives and other allied products. The Porter Company has also acquired the business of **Carlson & Sullivan, Inc.,** manufacturers of steel rules and measures. The latter will operate as part of the new Henry Disston Division.

Personal

Allen L. Tilsley has been appointed assistant general manager of railroad sales for the **Colorado Fuel & Iron Corp.,** with headquarters at Denver, Colo.

Walter A. St. Clair has been promoted to assistant sales manager, Eastern Industrial Truck Division of the **Hyster Company,** with headquarters at Danville, Ill.

Richard G. Nolte, plant manager for Crescent Industries, Inc., has been appointed vice-president and assistant to president of the **Duff-Norton Company.**

John F. Moran has joined the **Donald J. Hogan Company** as sales and service engineer.

Joe K. Lynch has been appointed resident manager of the newly opened sales office of the **Massey Concrete Products Company,** which will be located in the Brown Marx Building at Birmingham, Ala.

Robert A. Baer and **W. T. Richards** have been appointed West Coast sales representatives of the Mid-West Forging & Manufacturing Co.

E. B. Suydam has been appointed president of the **Linde Air Products Company,** a Division of **Union Carbide & Carbon Corp.,** with headquarters at New York. **William M. Haile** has been appointed vice-president of the company with headquarters also at New York.

C. G. Gehringer, assistant manager, Scale Division, **Fairbanks, Morse & Co.,** has been promoted to manager of that division. Mr. Gehringer replaces **George C. Worthley,** who has retired.

William D. Labaugh and **David A. Mitchell** have been appointed assistant sales managers, Creosote and Industrial Pitch Sales Division, **Barrett Division, Allied Chemical & Dye Corp.** Mr. Labaugh will maintain headquarters at New York, and Mr. Mitchell at St. Louis, Mo.

E. J. Mercer, industrial territory manager for **Allis-Chalmers Manufacturing Company,** has been promoted to general manager of the Construction Machinery Division, with headquarters at Milwaukee, Wis.

***Paul Azzolina,* who has been named manager of the service department, LeRoi Division, Westinghouse Air Brake Company, Milwaukee, Wis. Mr. Azzolina will be responsible for supervising field servicing of all LeRoi products, maintaining the parts department, and publication of the company's service bulletins and parts catalog.**

Obituary

William Simpson, formerly vice president of Templeton, Kenly & Co., died recently at California, Pa.

A Burro Crane, its operator and two men on the rail will set a fast pace for the track gang to follow. Rail gangs equipped with a Burro Crane produce more work per shift at lower cost because Burros have the pace-setting speed and efficiency that helps them keep on schedule. Equally efficient with tongs, magnet, hook, bucket or dragline, Burro Cranes handle any job in stride. Fast travel speeds get them to the job in a hurry . . . heavy draw bar pull permits hauling work train and gang.

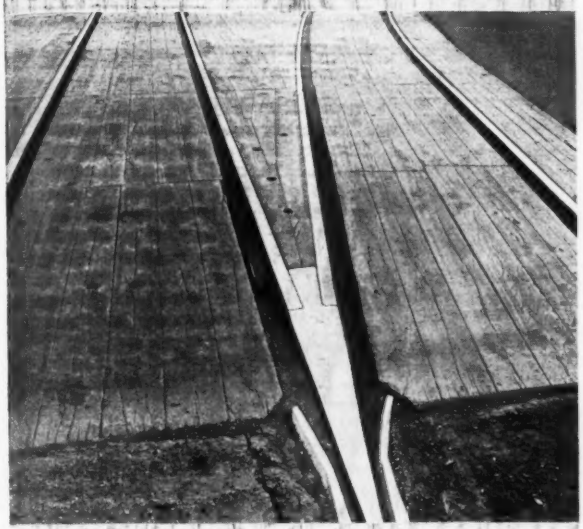
Only Burro Cranes Have:

- Fast travel speeds . . . up to 22 MPH
- Draw Bar Pull of 7500 lbs. often eliminates need for work train or locomotive
- Elevated Boom Heels for working over high sided gondolas
- Short tail swing — will not foul adjoining track
- Low overall height — a Burro can be worked and loaded on a standard flat car

Write for Bulletins on Burro Cranes

CULLEN-FRIESTEDT CO.
1301 SOUTH KILBOURN AVENUE • CHICAGO 23, ILLINOIS

CUT MAINTENANCE COSTS



MOSS Pressure Treated CROSSINGS

BUILT OF BLACK GUM TO LAST AND LAST!

GREATER STRENGTH . . .
The interlocking grain of this toughest of hardwoods ruggedly resists heavy, pounding vehicular and railroad traffic. Slabs now securely tied together with four through-bolts, also lock nuts that won't back off.

LONGER DURABILITY . . .
No heaving or spalling due to freezing and thawing, no potholes from heavy impact. Many Moss Crossings giving smooth, trouble-free service after 15 and more years.

MORE VERSATILITY . . .
Tailored to your specifications to fit any angle or curve, single or multiple track; no cutting or fitting on the job. Sectional construction makes installation simple and quick, relocation easy.

GREATER ECONOMY . . .
All this adds up to maximum satisfaction at minimum cost . . . no big capital expenditure, and minimum annual maintenance.

T. J. MOSS TIE COMPANY

700 SECURITY BLDG. • ST. LOUIS 2, MO.
CROSS TIES • SWITCH TIES • POLES & POSTS
PILING and CROSSINGS
WOOD PRESERVING PLANTS: E. St. Louis, Ill. Granville, Wis. • Shreveport, La. • Columbus, Miss.

Hot showers—with plenty of hot water spraying at real rinsing pressure, is just one of the conveniences-of-home that M/W Crews enjoy in Morrison-International CAMPCARS.

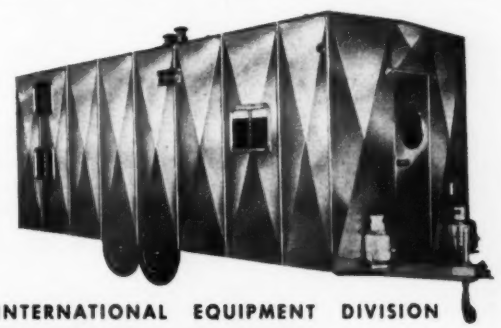
CAMPCARS are designed, engineered and built by railroad men — and offer the important facilities, and money-saving advantages that railroads are seeking today.

Let us show you how thousands of dollars can be saved annually when CAMPCARS are moving, housing, and servicing your M/W crews. Savings in man-hours, crew housing, and maintenance.

Just write for complete information on the seven standard CAMPCAR models available. You see how from 2 to 50 men or more can live independently of utilities and servicing for up to 10 days . . . and how 8 men can live more cheaply than the hotel allowance for one. It's an interesting and vital study.

MORRISON INTERNATIONAL CAMPCARS

Designed, Engineered & Built by a Railroad Supplier of over 30 years.



INTERNATIONAL EQUIPMENT DIVISION

MORRISON RAILWAY SUPPLY CORP

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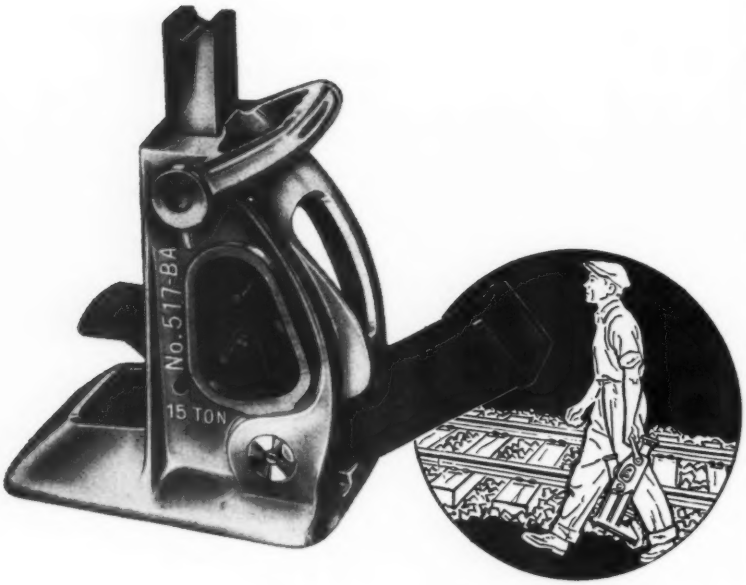
BUFFALO 12, N. Y.



Duff-Norton

Aluminum Track Jacks

pay off in two important ways...

First, by increasing productivity. Actual tests by alert maintenance managements show that when a workman is assigned a Duff-Norton aluminum track jack weighing 25% less than the one he has been using, he has more energy for actual work and can keep up with modern maintenance equipment.

Second, men like them. Any tool that is easier to use always makes a hit with workmen. Duff-Norton aluminum track jacks are easier to move and spot—save a man's energy for the actual surfacing and lining work rather than preparing for it.

Get all the facts on time and energy saving Duff-Norton aluminum track jacks—Models 517BA and 117A. They have the same time-tested features that have made Duff-Norton railroad jacks favorites with section gangs throughout the world. Write the world's oldest and largest manufacturer of lifting jacks, Duff-Norton Co., P. O. Box 1889, Pittsburgh 30, Pa.—Toronto 6, Ontario. Ask for bulletin AD-18-F.

DUFF-NORTON

Jacks

"Giving Industry A Lift Since 1883"

Letters from Readers . . .

A Foreman Speaks On Human Relations

TO THE EDITOR:

This letter refers to your discussion of "Human Relations and the Foreman" on the "Dear Readers" page of your December issue. Our railroad has set up a school on personnel and human relations. As one of two foremen selected to attend this school, I was deeply impressed with your analysis of the subject. Your story takes me back two years when our road supervisor was an old railroader known as the Old Man. He frequently told us: "Fellows, take one or two railway magazines; you can learn a pot full of information from them."

While the Old Man was on the job, all foremen of both track and extra gangs were kept fully informed of all things which happened in his district whether they were small or large. One of the things which I learned in human relations school was to let each man prove himself on any point which he wished to bring up. The Old Man has now retired and since I have come back from the school our new supervisor has given me a good going over. At one time he will tell me that I am too easy on the men. Then, when you get tough with them, he says, "You are too hard on them; the union will step in."

I have been a trackman for 12 years and a foreman for 5 years. During this time I have never been subjected to supervision of this type. The company went to considerable expense to send us to human relations school. I doubt if they wanted us to come back and be faced with a situation such as this. To be effective, schooling in human relations must include all supervisory personnel.

I admire your magazine for several reasons; it is one of the finest that I have read and I have read several of them. I am eager to learn all that I can for some day I hope to have a better position with some railroad.

TRACK FOREMAN

Says Golden Rule Gets Results

TO THE EDITOR:

I write to express my appreciation of your December editorial—"Human Relations and the Foreman." I tender my sincere compliments of your appraisal.

The time when a supervisor, in any capacity, merely laid down the law, allowing no personal reaction, is gone—in fact it never should have existed. I served in an administrative capacity for many years, and I early learned that if one wishes to create an organization of maximum efficiency the most effective policy is to place in effect the Golden Rule as a platform, and then to make certain the organization understands that this rule is in effect. Many times the help given me in the solution of a problem has seemingly come from divine inspiration.

HUGH M. TREMAINE
District Engineer (retired)
Northern Pacific

WOODINGS-VERONA

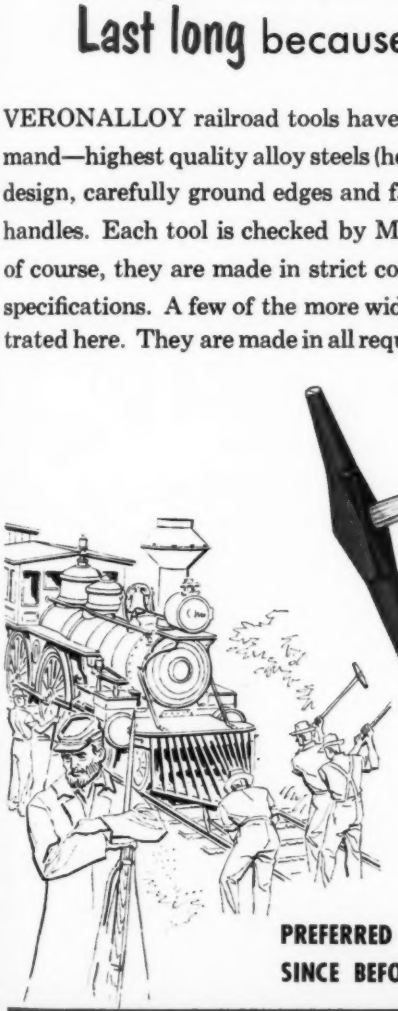
VERONALLOY

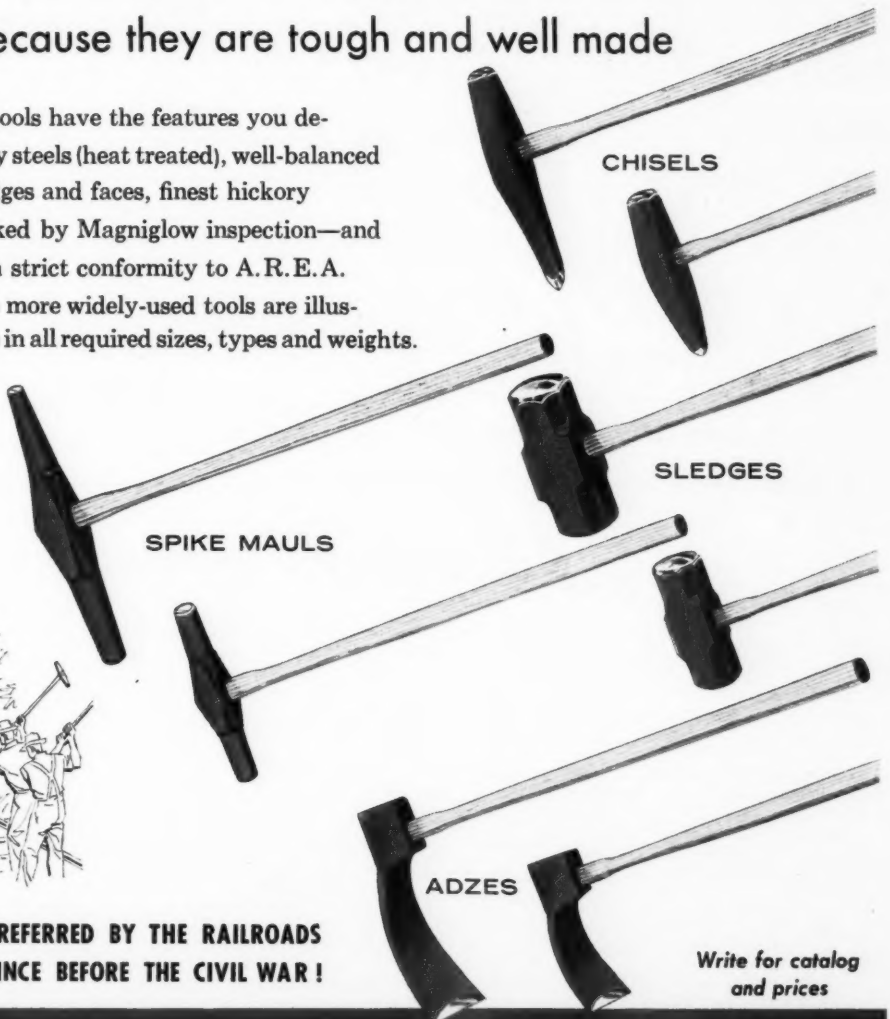
RAILROAD TOOLS

"Feel right" because they are properly balanced

Last long because they are tough and well made

VERONALLOY railroad tools have the features you demand—highest quality alloy steels (heat treated), well-balanced design, carefully ground edges and faces, finest hickory handles. Each tool is checked by Magniglow inspection—and of course, they are made in strict conformity to A.R.E.A. specifications. A few of the more widely-used tools are illustrated here. They are made in all required sizes, types and weights.





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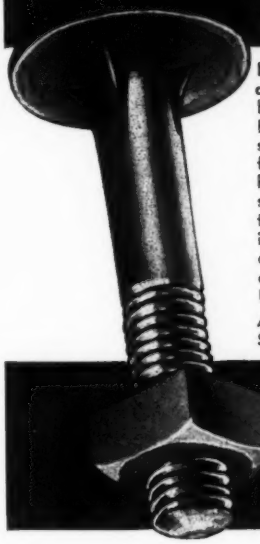

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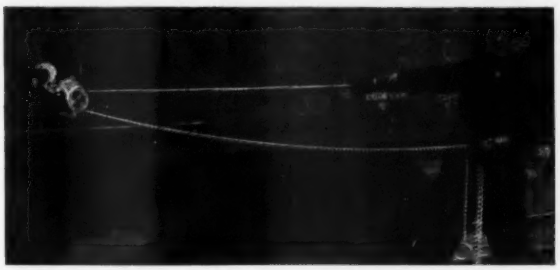

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Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the desired information. Requested items will be sent direct by manufacturers.

1. TRACTOR PARTS. *Caterpillar Tractor.* Two 8-page bulletins describe and illustrate Caterpillar tractor parts; discussion includes research, testing, development. (a) "Just as Good" compares parts available from machine manufacturer to those offered by substitute parts manufacturer. (b) "Parts Needed, Fast!" tells how Caterpillar parts service is designed for rapid return to work. *(Write-in A or B on coupon to receive desired folder.)*

2. SWITCH MACHINE. *Federal Telephone & Radio.* 4-page brochure (728) describes, illustrates and points out features of the FTR Model 55 Switch Machine for yard and terminal operation (right or left-hand installation, no special ties required).

3. 50 YEARS, ENTERPRISE. *Enterprise Railway Equipment.* 44-page presentation "Fiftieth Anniversary Book" is an illustrated brochure of the growth, purpose, personnel, products, manufacturing facilities, services and the research laboratory of Enterprise.

4. TURBO-DOZER. *Clark Equipment.* 20-page booklet (157) describes and illustrates the Michigan Model 180 Turbo-Dozer; 50 photos in film clip style show operation and correct use of this first rubber-tired dozer powered by a turbo-charged diesel engine.

5. ELECTRICAL WIRE & CABLE. *Okonite Co.* 16-page general catalog (1096) lists trade names, products and their applications, of Okonite electrical wire and cable; includes cable selection charts.

6. STEAM CLEANERS. *Malsbary Mfg.* 4-page catalog (156) "High Pressure Combination and Steam Vapor Cleaners" describes and depicts Malsbary steam cleaner line, tells difference between high pressure combination HPC models, steam vapor models, and fireless steam cleaners.

7. SILICONE PRODUCTS. *Dow Corning.* 12-page bulletin (1-110) "1956 Reference Guide to Dow Corning Silicone Products" describes 150 silicone products, 18 introduced during 1955; includes product descriptions, charts, tables, graphs, application photos.

8. HARDNESS CONVERSION. *International Nickel.* Handy, wallet-size celluloid card gives relationship between Brinell, DPH (Vickers), Rockwell and Shore Scleroscope hardness values and corresponding tensile strengths of steels.

9. GRATING & TREADS. *Klemp Metal Grating.* Brochure contains illustrated report on use of Steel, Aluminum and Stainless Grating and Stair Treads, discusses various types of electroforged welded grating, includes dimensional sketches and data on riveted grating.

10. ROLLING STEEL DOORS. *R. C. Mahon.* 16-page catalog (G-56) "Mahon Rolling Steel Doors, Grilles and Shutters" describes, illustrates, gives tables of dimensions for Mahon line of rolling steel doors.

11. WRITE-ON TAPE. *Labelon Tape.* 2 pocket-size folders discuss and illustrate Labelon tapes. Form L-6 describes new "Write-on-it" Tape, shows number of uses, includes actual sample. Form P-1 describes line of printed tapes, describes uses for both acetate film and flatback printed tape types.

12. HOSES & DUCTS. *Flexaust Co.* 6-page bulletin (60) describes, illustrates, shows typical uses, gives prices for Flexaust hoses and Portovent ducts (for dust collection, fume control, air conditioning, materials handling).

13. WIRE ROPE FITTINGS. *American Hoist & Derrick.* 28-page catalog (950-1) "Laughlin Fittings For Wire Rope and Chain" with illustrations of product pictures, includes engineering data and charts for each of fitting types.

14. INDUSTRIAL EQUIPMENT. *Precision Equipment.* 16-page catalog "Industrial Equipment" describes, illustrates, gives prices on the line of steel shelving, lockers and other storage and maintenance equipment for industrial and institution use.

15. ENGINEERING FIRM. *Teller Co.* 20-page brochure (D-3402) "A Guide For Selecting An Engineering Firm" differentiates between engineering installation firm, project engineering firm and engineering design firm; prepared for those responsible for their company's entering new product fields, for plant automation, modernization or expansion.

16. COMPRESSION FITTINGS. *Dresser Mfg.* 12-page brochure describes, gives specifications on Flexible Compression Fittings, illustrated with photos and drawings, highlights use on steel piping and copper tubing; applications include diesel locomotives and irrigation piping.

17. CENTRIFUGAL FANS. *Chicago Blower Corp.* Bulletin (A-102) describes and illustrates the Chicago line of Airfoil Centrifugal Fans; includes design features and applications.

18. PLASTIC PIPE. *National Tube.* 32-page bulletin (24) describes, illustrates, gives specifications, lists applications of this National Polyvinyl Chloride Plastic Pipe.

Reader Service Department **February, 1956**
Railway Track and Structures
30 Church Street, New York 7, N. Y.

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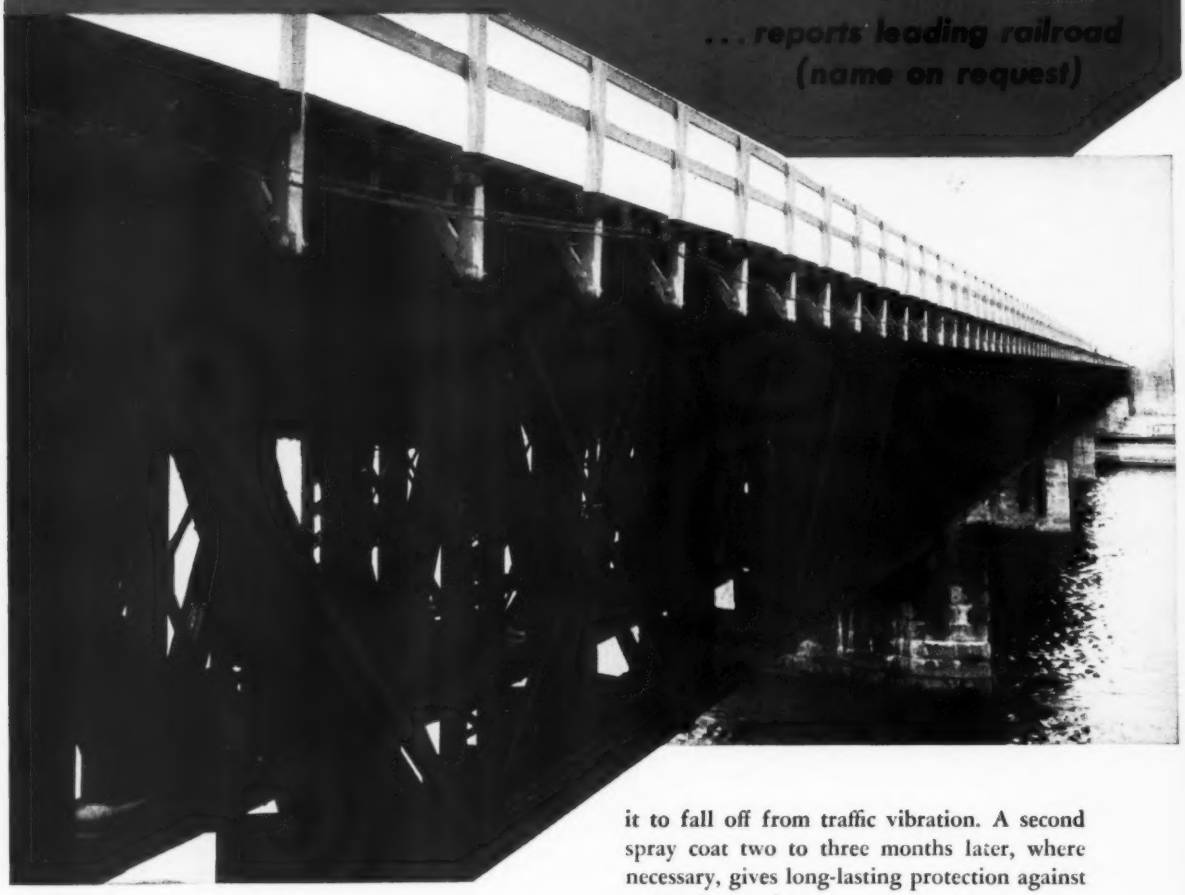

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